

## Section 11: Appendices

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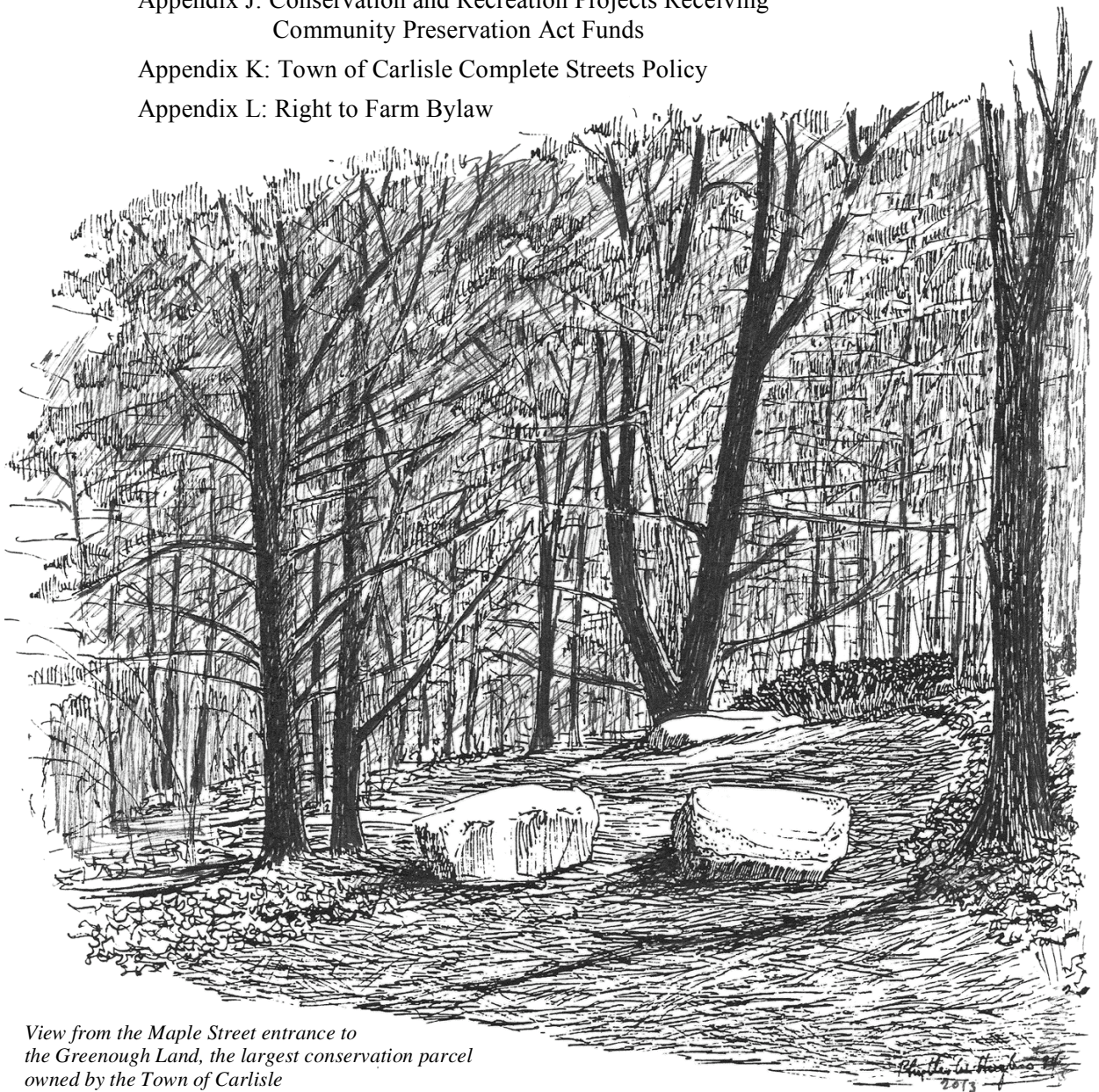
Appendix H: Recreation Commission: Grievance Policy: Equal Access

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*View from the Maple Street entrance to  
the Greenough Land, the largest conservation parcel  
owned by the Town of Carlisle*

**Appendix A**  
**Land Protection Values**  
**(for Ranking Unprotected Private Properties of 10 Acres or More)**

APPENDIX

**A**

## **Appendix A: Land Protection Values (for Ranking Unprotected Private Properties of 10 Acres or More)**

### **Land Protection Criteria and Values Defined** *(in alphabetical order)*

**Agricultural Land (Prime or Active)** – The land possesses fertile or arable soil suitable for agriculture, including growing crops or other plants or grazing animals, whether or not it is currently in agriculture.

**Active Recreation** – The land is suitable for playing fields, recreational activities (such as sledding, swimming, and ice skating), recreational facilities, or garden plots.

**Core Habitat** – The land provides habitat for rare, vulnerable, or uncommon native species. Relevant areas were identified from the Massachusetts Natural Heritage and Endangered Species Program *BioMap2* and the 2011 CAPS (Conservation Assessment and Prioritization System) IEI (Index of Ecological Integrity) for the Town of Carlisle, MA (maps at the end of Appendix C).

**Diversity of Habitat** – The land contains an unusual terrain, a terrain underrepresented in town, or a variety of terrains and thus provides for a variety of habitats, which, in turn, may support a variety of native animals or plants.

**Level of Development** – The land is currently undeveloped, minimally developed, easily returned to an undeveloped state, or could be subdivided to create a significant relatively undeveloped parcel.

**Linking Location** – The land abuts a parcel of land that is already protected (existing link), a significant parcel that is undeveloped and unprotected (potential link), or provides access to another parcel of conservation interest. Both existing and potential links increase the usefulness of the entire tract (linking parcel plus abutting parcel) both for recreation and for native plant and animal habitat.

**Rural Vista** – The land provides a view of open fields, woodlands, or water visible from any road. Visibility from a major road is more important than visibility from a neighborhood road.

**Size** – Larger parcels are more valuable than smaller parcels for values such as plant and animal habitat, protection of water resources, and active or passive recreation. Abutting parcels under the same ownership are treated as one parcel.

Parcels greater than or equal to 30 acres were scored 4;  
parcels greater than or equal to 20 acres but less than 30 acres were scored 3;  
parcels greater than or equal to 10 acres but less than 20 acres were scored 2;  
parcels less than 10 acres were scored 1.

**Special Feature** – The land contains an unusual feature, such as a special habitat, a scenic spot, an exceptional woodland, or a site with archaeological, geological, historical, or other interest.

**Trails** – The land contains cart paths, trails, potential links to existing trails, or areas where new trails can be created for passive recreation to help improve the Carlisle Trail System.

**Water Resources** – The land includes areas significant for water resources protection. The land contains or is adjacent to surface water (Concord River, streams, ponds), wetlands, vernal pools, and potential sites for town wells, protective zones around town wells, or recreational use.

**Appendix B****Carlisle Conservation Commission: Rules and Regulations**

Rules and Regulations for Use of Carlisle Conservation Land B-1

Rules And Regulations of Town of Carlisle Conservation  
Commission on Use of Other Power-Driven Mobility Devices  
on Town of Carlisle Conservation Lands per the  
Americans with Disabilities Act (ADA) B-4



## **Appendix B: Carlisle Conservation: Commission Rules and Regulations**

### **Rules and Regulations for Use of Carlisle Conservation Land**

#### **1. HOURS, NIGHT USE BY PERMIT**

All people are welcome to enjoy themselves on the conservation land of the Town of Carlisle. They do so at their own risk from sunrise to sunset provided such use is consistent with the Commission's rules and regulations and other applicable local, state and federal laws, rules and regulations. The conservation land and parking lots may not be used between sunset and sunrises except in accordance with a permit duly issued by the Carlisle Conservation Commission (the "Commission"). Groups of eight or more people that wish to use conservation land must obtain a use permit. This permit may be granted by one Commissioner or by the Commission Administrator, except that if said groups wish to use the conservation land in excess of four (4) daylight hours, that use permit must be duly issued by a majority vote of the Commission.

#### **2. FIRES BY PERMIT**

Open fires are forbidden on conservation land except by permits duly issued by the Commission and the Carlisle Fire Department. The use of portable stoves does not require a fire permit, but the intention to use such stoves must be reported in writing to the Commission and the Carlisle Fire Department or noted on any use permit issued in accordance with Rule 1 hereinabove. The following fire safety measures shall apply on all conservation land: Stoves or open fires shall be at least three (3) feet from any combustible material; those making fires or operating stoves must possess an operable fire extinguisher rated consistent with the object fire and/or stove; they must also possess a spade, iron rake and water supply reasonably adequate to suppress the fire or the stove.

#### **3. CAMPING BY PERMIT**

Overnight camping on conservation land is permitted under the Camping Regulations on Town Conservation Land available through the Conservation Commission Office, Carlisle Town Hall, 66 Westford Street, Carlisle, MA 01741 or the Town of Carlisle website, <http://www.carlislema.gov/pages/index>. Call 978-369-0336 for an appointment with the Conservation Commission Administrator.

#### **4. ARMS/FIREARMS BY PERMIT**

Arms/firearms, ammunition, bows, arrows and all other projectile weapons or devices are forbidden on conservation land, except that a majority of the Commission may issue an Arms/firearms permit for such use at Foss Farm, but only for non-hunting activities. Historically, the activities which have received permits include the colonial musters and dog training.

#### **5. SPONSORED EVENTS AND CONCESSIONS BY PERMIT**

No one shall engage in business, sell or expose for sale or give away goods or circulars without a permit from the Commission. Applications for sponsored events will be accepted only from non-profit organizations. No admission or parking fees may be charged, but donations to the organization may be requested by posting a sign at the entrance to the event. Registration fees may be charged to participants but not to spectators in events organized by the sponsoring group. The Commission will ordinarily authorize only concessions for food to be consumed on the premises. In limited circumstances, when the Commission deems it in

the public interest, additional concessions may be permitted. Although primary use of the land may be reserved for a specific event, other regular activities on the land shall continue on any given day.

**6. TRAILS**

New trails or extensions of existing trails may not be installed by any person unless duly authorized by majority vote of the Conservation Commission at a public meeting.

**7. PENALTIES**

Without limiting any other available remedies or penalties, any person who submits false information in connection with any documentation or application required under these Rules or Regulations, or who otherwise violates these Rules and Regulations may be punished by a fine of not more than fifty dollars (\$50.00) for each violation hereof. Each day or part thereof during which such violation occurs or continues shall constitute a separate violation.

**CARLISLE CONSERVATION LAND USES**

**1. Uses allowed on all Conservation Land.**

- Walking, hiking, jogging, running
- Picnicking
- Kite-flying
- Horseback riding
- Snowshoeing
- Cross country skiing
- Nature study (observation)
- Other uses of a passive recreational nature

**Uses prohibited except by special permission from a majority of the Commission**

- Camping
- Discharge of firearms
- Fires (Fire department must also issue permit)

**Uses prohibited on all Conservation Land**

- Hunting, trapping
- Swimming
- Driving motorized vehicles (except by special permit and as regulated on Foss Farm)

***Use by camping and large organized groups***

- To be scheduled through the Conservation office

**2. Additional uses allowed on specific parcels of land**

**Greenough Land**

- Ice skating
- Fishing, ice fishing
- Canoeing

**Foss Farm**

Pony Club activities  
Dog shows  
Dog field trials  
Dog sledding  
Dog training classes  
Horse show  
4-H Club activities  
Fairs  
Colonial Minutemen Historical Muster  
Plot gardens

**Towle Field**

X-C Ski League

*Date Adopted: September 2013*

## **Rules and Regulations of Town of Carlisle Conservation Commission on Use of Other Power-Driven Mobility Devices on Town of Carlisle Conservation Lands per the Americans with Disabilities Act (ADA)**

1. Introduction and Authority: These Rules and Regulations (“Rules”) describe and regulate use of other power-driven mobility devices (OPDMDs) on Town of Carlisle conservation lands pursuant to the U. S. Department of Justice regulations amending the Americans with Disabilities Act (“ADA”), Title II, 28 C.F.R., Part 35, effective March 15, 2011.

In addition to these Rules, all conservation land users should be familiar with the Rules & Regulations for Use of Carlisle Conservation Land and the Trail Etiquette Guidelines for the use of conservation lands in Carlisle.

These Rules are promulgated by the Conservation Commission pursuant to the authority granted under M.G.L. c. 40, Section 8C and Article III, Section 3.14 of the Town of Carlisle General Bylaws.

2. Definitions: For the purposes of these Rules, the following terms shall have the following meanings unless a different meaning is clearly stated:

“Commission” or “Conservation Commission”: the Town of Carlisle Conservation Commission.

“Narrow Single-Track Trail”: unpaved, narrow gauge trail suitable for hiking, cross-country skiing, and mountain biking only. This type of trail is for natural areas or steep terrain where environmental or topographic constraints require no user impact to natural resources or for trails that do not provide adequate space to OPDMDs for safe passage of trail-users traveling in opposing directions. All trails not listed in either Appendix A or Appendix B are Narrow Single-Track Trails.

“Other Power-Driven Mobility Device” or “OPDMD”: any mobility device powered by batteries, fuel, or other engines, whether or not designed primarily for use by individuals with mobility disabilities, that is used by individuals with mobility disabilities for the purpose of locomotion, including golf carts, electronic personal assistance mobility devices (EPAMDs), such as the Segway® PT, or any mobility device designed to operate in areas without defined pedestrian routes, but that is not a wheelchair within the meaning of Part 35 of the Title II Regulations.

“Service Trail”: unpaved, unimproved service trail, typically greater than 8 feet in width, capable of accommodating service vehicle traffic. See Appendix A for list of Service Trails.

“Town”: the Town of Carlisle, Massachusetts.

“Wide Single-Track Trail”: unpaved trail suitable for multiple activities, including hiking, skiing, mountain biking or equestrian riding. These are trails where two-way traffic would require pedestrians to step off the trail and harm natural resources when allowing passage of OPDMD devices larger than 26” wide. See Appendix B for list of Wide Single-Track Trails.

3. Trail Use: The Town of Carlisle’s conservation lands and trails are available for use to individuals with a mobility disability subject to these Rules. The purposes of these Rules are

the physical safety of OPDMD users and other trail users, the protection of sensitive natural resources, noise mitigation and fire prevention.

- a. The use of OPDMDs powered by internal combustion engines is prohibited. The exclusion of gas-powered OPDMDs, as compared to electric-powered OPDMDs, is due to the substantial risk of serious harm to the immediate environment from the fire danger created by the heat of the gas-fired engine and from noise impacts to animal habitats.
- b. Noise emitted by OPDMDs may not exceed 65 decibels.
- c. No person shall operate an OPDMD at a speed in excess of 3 miles per hour (which equals normal walking speed).
- d. OPDMDs must stay on designated trails at all times. Many trails pass near or cross wetlands and are vulnerable to erosion, particularly during wet periods.
- e. No OPDMDs are permitted in historical structures.
- f. Additional limitations are based on the type of trail:
  - i. **Service Trail:** All OPDMDs are allowed on service trails provided that the OPDMDs do not exceed 36" inch maximum width in order to allow safe passage of OPDMDs, pedestrians, equestrian riders, and service vehicles;
  - ii. **Wide Single-Track Trail:** OPDMDs not to exceed 26" inch maximum width and a maximum wheel width of 6" are allowed on Wide Single-Track Trails;
  - iii. **Narrow Single-Track Trail:** No OPDMD devices are permitted on Narrow Single-Track Trails. All trails not assessed as Service Trails or Wide Single-Track Trails (Appendices A and B) are defined as Narrow Single-Track Trails.

4. Limitations:

- a. The adoption of these Rules does not represent an endorsement that the Town's trails or conservation properties are safe for any trail user. Users must exercise reasonable caution and care while on Town conservation lands and operate OPDMDs at their own risk.
- b. These Rules may be amended from time to time as new information is available regarding the extent of physical constraints, resource protection criteria, specific trail conditions, and safety concerns for all trail users.
- c. Nothing in these Rules shall contradict Federal or Commonwealth of Massachusetts statutes or regulations. In the case of conflict, Federal or Commonwealth statutes or regulations shall prevail.
- d. Use of other vehicles may be allowed on conservation lands with the specific approval and issuance of a permit by the Conservation Commission. This includes farm vehicles.

5. Enforcement:

- a. Whoever violates any provision of these Rules may be penalized by indictment or on complaint brought in the District Court. The maximum penalty for each violation shall be fifty dollars (\$50.00).
- b. Whoever violates any provision of the Rules may be penalized by non-criminal disposition as provided in General Laws, Chapter 40, Section 21D, in which case the penalty for each violation shall be one hundred dollars (\$100.00) and the enforcing persons shall be the Conservation Commission, its Agent or any Police Officer of the Town.

6. Additional Information:

Complete trail maps and Trail Etiquette guidelines are available on the Trails Committee website at [CarlisleTrails.pbworks.com](http://CarlisleTrails.pbworks.com) and in the "Trails in Carlisle" booklet, prepared by the Carlisle Trails Committee. The booklet is available at the Carlisle Town Hall and local retail



outlets. For information on trail use and trail conditions, contact the Town of Carlisle Conservation Administrator, at 66 Westford Street Carlisle, MA, or (978) 369-0336.

#### Appendix A: Service Trails

<b>Parcel</b>	<b>Trail</b>
Benfield Conservation Land	Larsen Trail (to Benfield Platform)
Cranberry Bog	East Bog Loop West Bog Loop
Davis Corridor	Blood Farm Trail
Foss Farm	Foss Farm Loop Trails at garden plots
Morse Road	Old Morse Road

#### Appendix B: Wide Single-Track Trails

<b>Parcel</b>	<b>Trail</b>
Bisbee Land	Bisbee Loop
Davis Corridor	Two Rod Road
Foss Farm	Pony Ring East South Field Loop Woods Loop
Fox Hill	Fox Hill Trail
Greenough Land	Wood Duck Trail Rangeway North
Mannis Land/Chestnut Hill	
Spencer Brook Reservation	Spencer Brook Trail
Towle Land	Towle Field Trail
Town Forest	Hurricane Alley Sandy's Path Town Forest Trail

*Adopted September 10, 2020*

**Appendix C**  
**Natural Heritage & Endangered Species Program (NHESP)**

NHESP Summary Letter	C-1
Carlisle Rare Species Documented with NHESP	C-4
Other State-Listed or Uncommon Carlisle Species	C-4
Fact Sheets of Documented State-Listed Species in Carlisle	
Climbing Fern	C-7
Arethusa (Dragon's Mouth)	C-9
Few-seeded Sedge	C-11
Purple Milkweed	C-13
Cornel-leaved Aster	C-15
New England Blazing Star	C-17
Britton's Violet	C-19
Twelve-spotted Tiger Beetle	C-21
Mocha Emerald Dragonfly	C-23
Blue-spotted Salamander	C-26
Blanding's Turtle	C-32
Wood Turtle	C-35
Eastern Box Turtle	C-38
Following page C-40	
BioMap2: Conserving the Biodiversity of Massachusetts in a Changing World – Carlisle (2012)	
CAPS Index of Ecological Integrity (IEI) Town of Carlisle, MA (2011)	



*Lygodium palmatum (Climbing Fern)*  
 is the logo on the NHESP Fact Sheets.

## Appendix C: Natural Heritage & Endangered Species Program (NHESP)



### DIVISION OF FISHERIES & WILDLIFE

1 Rabbit Hill Road, Westborough, MA 01581  
p: (508) 389-6300 | f: (508) 389-7890  
**MASS.GOV/MASSWILDLIFE**

February 5, 2020

Sylvia Willard  
Conservation Agent  
Town of Carlisle  
66 Westford St.  
Carlisle, MA 01741

RE: Carlisle Open Space and Recreation Plan

Dear Ms. Willard:

Thank you for contacting the Massachusetts Natural Heritage and Endangered Species Program (NHESP) regarding the Open Space and Recreation Plan for the Town of Carlisle. Enclosed is information on species listed under the Massachusetts Endangered Species Act (MESA), as well as on Priority Natural Communities, Certified and Potential Vernal Pools, Coldwater Fishery Resource streams and rivers, and other aspects of biodiversity documented in our database for the Town of Carlisle. The Town is encouraged to include this letter and associated materials in the Open Space and Recreation Plan.

#### MESA-listed Species

According to the NHESP database, the Town of Carlisle currently has habitat for the following rare species listed under MESA:

- Blanding's Turtle (*Emydoidea blandingii*, Threatened)
- Britton's Violet (*Viola brittoniana*, Threatened)
- Blue-spotted Salamander (*Ambystoma laterale*, Special Concern)
- Twelve-spotted Tiger Beetle (*Cicindela duodecimguttata*, Special Concern)
- Wood Turtle (*Glyptemys insculpta*, Special Concern)
- Climbing Fern (*Lygodium palmatum*, Special Concern)
- Mocha Emerald (*Somatochlora linearis*, Special Concern)

Fact sheets on these species may be downloaded from our website at <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/species-information-and-conservation/mesa-list/list-of-rare-species-in-massachusetts.html>. The Town is encouraged to include these fact sheets in its Plan.

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### **Priority Natural Communities**

There are no Priority Natural Communities documented to NHESP from Carlisle.

### **Vernal Pools**

As of this date, there are 78 Certified and 88 Potential Vernal Pools documented from Carlisle. The Town is encouraged to require developers to certify pools on any property requiring permits from the Town and, as well, to certify any pools on the Town's own property.

### **Coldwater Fishery Resources**

There are no Coldwater Fisheries Resource streams in Carlisle.

### **BioMap2**

Five areas within Carlisle are *BioMap2* Core Habitat. They include one Aquatic Core, one Forest Core, three Wetland Cores, and areas for seven Species of Conservation Concern.

Adjacent to and overlapping some of these Core Habitats in Carlisle is one area of *BioMap2* Critical Natural Landscape, including two Aquatic Buffers, one Landscape Block, and one Wetland Buffer. For an explanation of *BioMap2* and the Core Habitats within Carlisle, please see the attached *BioMap2* Report.

### **Discussion**

In a town like Carlisle, it can be hard to decide which areas are the highest priorities for conservation actions. The Town should consider carefully these suggestions for inclusion in its Open Space and Recreation Plan:

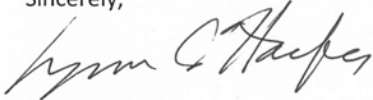
- **Land Protection:** Much of Carlisle is already developed or conserved; very few properties are left that are both undeveloped and unprotected. A few such parcels are in BioMap2 Core Habitat #2378, which runs northwest from Great Meadows National Wildlife Refuge through Great Brook Farm State Park. These parcels could be targeted for conservation.
- **Habitat Management:** The Town should assess its recreation and conservation areas for the presence of invasive species, and encourage the owners of large conserved properties to do the same. If invasives are present in substantial numbers or areas, consider removing them. (Note that MassWildlife currently offers grants to fund habitat management activities).
- **Regulation:** The Town should support and encourage its Conservation Commission to enforce the provisions of the Massachusetts Wetlands Act. While there is no local board or official charged with enforcing the provisions of the Massachusetts Endangered Species Act, the Town could consider having the Conservation Commission and the Building Inspector notify development applicants of the presence/absence of Priority Habitat of Rare Species on the applicant's property.
- **Education and Outreach:** Developing community support for conservation of biodiversity is essential for successful efforts at land protection, habitat management, and regulation. Offering field trips on Town and other conservation areas, writing articles on conservation for local websites and newspapers, and encouraging local students to conduct biological surveys and

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observations on conservation areas are a few of the low-cost ways to build support that will pay off in the future.

The Town of Carlisle is to be commended for undertaking production of an Open Space and Recreation Plan. Please do not hesitate to call me at 508-389-6351 if you have any further questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Lynn C. Harper". The signature is fluid and cursive, with the first name "Lynn" being more prominent.

Lynn C. Harper

Habitat Protection Specialist

Massachusetts Natural Heritage & Endangered Species Program

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## Carlisle Rare Species Documented with NHESP

COMMON NAME	GENUS AND SPECIES	TAXONOMIC GROUP	STATUS	LATEST RECORD
<b>Vascular Plants</b>				
Climbing Fern	<i>Lygodium palmatum</i>	Ferns & Allies	Special Concern	2010
Arethusa (Dragon's Mouth)	<i>Arethusa bulbosa</i>	Monocots	Threatened	1904 *
Few-seeded Sedge	<i>Carex oligosperma</i>	Monocots	Endangered	1915
Purple Milkweed	<i>Asclepias purpurascens</i>	Dicots	Endangered	1888
Cornel-leaved Aster	<i>Doellingeria infirma</i>	Dicots	Endangered	1915
New England Blazing Star	<i>Liatris novae-angliae</i>	Dicots	Special Concern	1885
Britton's Violet	<i>Viola brittoniana</i>	Dicots	Threatened	2019
<b>Animals</b>				
Twelve-spotted Tiger Beetle	<i>Cicindela duodecimguttata</i>	Insects	Special Concern	2015
Mocha Emerald Dragonfly	<i>Somatochlora linearis</i>	Insects	Special Concern	2014
Blue-spotted Salamander	<i>Ambystoma laterale</i>	Amphibians	Special Concern	2018
Blanding's Turtle	<i>Emydoidea blandingii</i>	Reptiles	Threatened	2015
Wood Turtle	<i>Glyptemys insculpta</i>	Reptiles	Special Concern	2000
Eastern Box Turtle	<i>Terrapene carolina</i>	Reptiles	Special Concern	1988

\* Historic sighting; no longer on NHESP list

## Other State-Listed or Uncommon Carlisle Species

COMMON NAME	GENUS AND SPECIES	TAXONOMIC GROUP	STATUS
<b>Vascular Plants</b>			
Red Pine	<i>Pinus resinosa</i>	Conifers	Watch List
Northern White Cedar (Arbor Vitae)	<i>Thuja occidentalis</i>	Conifers	Endangered
Canada Bluejoint (Reed Grass)	<i>Calamagrostis canadensis</i> <i>var. canadensis</i>	Monocots	Watch List
Shining Wedgegrass	<i>Sphenopholis nitida</i>	Monocots	Threatened
Orange Milkweed (Butterfly Weed)	<i>Asclepias tuberosa</i>	Dicots	Watch List
River Birch	<i>Betula nigra</i>	Dicots	Watch List
Upright False Bindweed	<i>Calystegia spithamea</i>	Dicots	Endangered
Rough Wood Aster	<i>Eurybia radula</i>	Dicots	Watch List
Cursed Crowfoot	<i>Ranunculus scleratus</i>	Dicots	Watch List
<b>Animals</b>			
Golden Northern Bumble Bee	<i>Bombus fervidus</i>	Insects	Action Plan
American Bumble Bee	<i>Bombus pensylvanicus</i>	Insects	Endangered
Ringed Boghaunter Dragonfly	<i>Williamsonia lintneri</i>	Insects	Threatened

## Other State-Listed or Uncommon Carlisle Species *(continued)*

COMMON NAME	GENUS AND SPECIES	TAXONOMIC GROUP	STATUS
White Sucker	<i>Catostomus commersonii</i>	Bony Fishes	Action Plan
Common Shiner	<i>Luxilus cornatus</i>	Bony Fishes	Action Plan
Bridle Shiner	<i>Notropis bifrenatus</i>	Bony Fishes	Special Concern
Blacknose Dace	<i>Rhinichthys atratulus</i>	Bony Fishes	Action Plan
Fallfish	<i>Semotilus corporalis</i>	Bony Fishes	Action Plan
Northern Leopard Frog	<i>Lithobates pipiens</i>	Reptiles	Action Plan
Eastern Ribbon Snake	<i>Thamnophis saurita</i>	Reptiles	Action Plan
Northern Goshawk	<i>Accipiter gentilis</i>	Birds	Action Plan
American Black Duck	<i>Anas rubripes</i>	Birds	Action Plan
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	Birds	Special Concern
Great Egret	<i>Ardea alba</i>	Birds	Action Plan
Long-eared Owl	<i>Asio otus</i>	Birds	Special Concern
Upland Sandpiper	<i>Bartramia longicauda</i>	Birds	Endangered
Ruffed Grouse	<i>Bonasa umbellus</i>	Birds	Action Plan
American Bittern	<i>Botaurus lentiginosus</i>	Birds	Endangered
Broad-winged Hawk	<i>Buteo platypterus</i>	Birds	Action Plan
Semipalmated Sandpiper	<i>Calidris pusilla</i>	Birds	Action Plan
Canada Warbler	<i>Cardellina canadensis</i>	Birds	Action Plan
Chimney Swift	<i>Chaetura pelagica</i>	Birds	Action Plan
Common Nighthawk	<i>Chordeiles minor</i>	Birds	Action Plan
Northern Harrier	<i>Circus hudsonius</i>	Birds	Threatened
Marsh Wren	<i>Cistothorus palustris</i>	Birds	Action Plan
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	Birds	Action Plan
Northern Bobwhite	<i>Colinus virginianus</i>	Birds	Action Plan
Olive-sided Flycatcher	<i>Contopus cooperi</i>	Birds	Action Plan
Bobolink	<i>Dolichonyx orizvorus</i>	Birds	Action Plan
Snowy Egret	<i>Egretta thula</i>	Birds	Action Plan
Horned Lark	<i>Eremophila alpestris</i>	Birds	Action Plan
Rusty Blackbird	<i>Euphagus carolinus</i>	Birds	Action Plan
Peregrine Falcon	<i>Falco peregrinus</i>	Birds	Special Concern
American Kestrel	<i>Falco sparverius</i>	Birds	Action Plan
Wilson's Snipe	<i>Gallinago delicata</i>	Birds	Action Plan
Common Gallinule	<i>Gallinula galeata</i>	Birds	Special Concern
Common Loon	<i>Gavia immer</i>	Birds	Special Concern
Herring Gull	<i>Larus argentatus</i>	Birds	Action Plan
Great Black-backed Gull	<i>Larus marinus</i>	Birds	Action Plan
Nashville Warbler	<i>Leiothlypis ruficapilla</i>	Birds	Action Plan
Black-and-white Warbler	<i>Mniotilta varia</i>	Birds	Action Plan
Black-crowned Night Heron	<i>Nycticorax nycticorax</i>	Birds	Action Plan
Louisiana Waterthrush	<i>Parkesia motacilla</i>	Birds	Action Plan
Double-crested Cormorant	<i>Phalacrocorax auritus</i>	Birds	Action Plan
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	Birds	Action Plan

## Other State-Listed or Uncommon Carlisle Species *(continued)*

COMMON NAME	GENUS AND SPECIES	TAXONOMIC GROUP	STATUS
Scarlet Tanager	<i>Piranga olivacea</i>	Birds	Action Plan
American Woodcock	<i>Scolopax minor</i>	Birds	Action Plan
Northern Parula	<i>Setophaga americana</i>	Birds	Threatened
Prairie Warbler	<i>Setophaga discolor</i>	Birds	Action Plan
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	Birds	Action Plan
Blackpoll Warbler	<i>Setophaga striata</i>	Birds	Special Concern
Blue-winged Teal	<i>Spatula discors</i>	Birds	Action Plan
Field Sparrow	<i>Spizella pusilla</i>	Birds	Action Plan
Eastern Meadowlark	<i>Sturnella magna</i>	Birds	Special Concern
Brown Thrasher	<i>Toxostoma rufum</i>	Birds	Action Plan
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	Birds	Endangered
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	Birds	Action Plan
White-throated Sparrow	<i>Zonotrichia albicollis</i>	Birds	Action Plan
Moose	<i>Alces americanus</i>	Mammals	Action Plan
Big Brown Bat	<i>Eptesicus fuscus</i>	Mammals	Action Plan
Northern Flying Squirrel	<i>Glaucomys sabrinus</i>	Mammals	Action Plan
Eastern Red Bat	<i>Lasiurus borealis</i>	Mammals	Action Plan
Bobcat	<i>Lynx rufus</i>	Mammals	Action Plan
American Black Bear	<i>Ursus americanus</i>	Mammals	Action Plan



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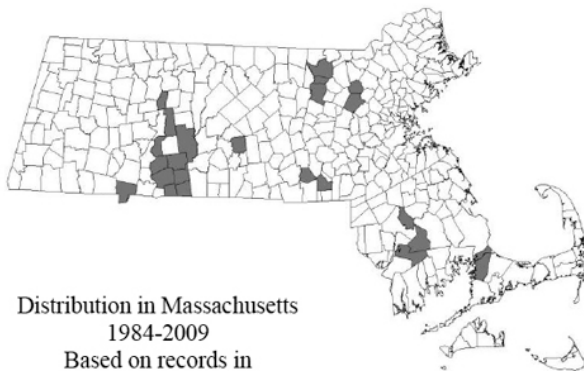
## Climbing Fern *Lygodium palmatum* (Bernh.) Sw.

State Status: **Special Concern**

Federal Status: **None**

**DESCRIPTION:** Climbing Fern does not have the characteristic overall shape of most ferns. It is an evergreen, ivy-like plant which sprawls over the ground or climbs clockwise short distances up shrubs and coarse herbs. In very favorable conditions, Climbing Fern may carpet up to an acre or more of the forest floor. The rootstalk is black, wiry, widely creeping, and branching. The root sends up a row of twining delicate fronds to a height of 3-5 ft. (0.9-1.5 m). The pinnae (fern equivalent of leaflets) are a forking stalk, each stalk ending in a palmately lobed yellow-green blade about 2 in (3-6 cm) across. The fertile blades are tiny, palmate, and produce spores on the underside. The gross morphology of this fern distinguishes it from any other species in Massachusetts.

**HABITAT IN MASSACHUSETTS:** Climbing Fern grows in moist pine-oak-maple woods with an open understory, in moist thickets, and along stream margins. This plant prefers acidic soils that are sandy and rich in humus, but nutrient-poor. Regenerating woodlands and powerline corridors also provide habitat for this species in Massachusetts.



Distribution in Massachusetts  
1984-2009  
Based on records in  
Natural Heritage Database



Photo by Bruce Sorrie, NHESP

**RANGE:** Climbing Fern occurs from southern New Hampshire and northwestern Vermont west to Michigan, and south to Georgia and Alabama.

**POPULATION STATUS:** Climbing Fern is a Species of Special Concern in Massachusetts. It is considered rare in New Hampshire, Vermont, Rhode Island, Connecticut, New York, New Jersey, Maryland, West Virginia, Virginia, North and South Carolina, Alabama, Georgia, Indiana, and Michigan. It was known

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historically from Delaware and Washington, DC. There are 34 current sites (since 1984) in Massachusetts for Climbing Fern, and 27 additional historical (before 1984) locations.

In the 1800s, when Climbing Fern was much more common, it was very popular as a decoration and commercial collection contributed to its decline. The first plant protection law was passed in Connecticut in 1869 specifically to protect this species. Legal protection helped alleviate the collection problem. However, loss of habitat through expansion of agriculture and development continued as the major factor contributing to the species decline.

Although Climbing Fern may be abundant where it is found, populations are rare and localized. Climbing Fern continues to decline in Massachusetts due to loss of habitat through draining and filling of wetlands, land development projects, and the maturation of woodlands. Seemingly appropriate habitat for Climbing Fern is fairly common in Massachusetts; however, for unknown reasons, Climbing Fern occurs in only a very few of these areas.

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**Arethusa  
*Arethusa bulbosa*  
L.**

State Status: **Threatened**  
Federal Status: **None**

**DESCRIPTION:** *Arethusa* is a showy perennial orchid usually 10 to 30 cm (4 to 11 inches tall). Out of the bulbous corm (a thick, fleshy root stalk) grows a single erect stem topped by one, or sometimes two, magenta to dark pink flowers. The lowest petal, or lip (about an inch long), arches abruptly downwards, and its whitish convoluted surface is mottled with magenta and yellow. The flower is pollinated by bumblebees of the genus *Bombus*. In Massachusetts, flowering occurs from late May to mid-June. After the flower has wilted, a single sharply pointed leaf grows from the uppermost scale on the stem, becoming about 15 cm (6 in.) long and 1.2 cm (½ in.) wide. Still later in the year, a fruiting capsule is sometimes seen on the dried stalk. The capsule is elliptical, one inch long, and has six pronounced ribs.

**SIMILAR SPECIES IN MASSACHUSETTS:** Rose Pogonia (*Pogonia ophioglossoides*) is similar but has a number of differences. The flowers of Rose Pogonia are shades of pink, rather than magenta. Two of its outer “petals” (actually pink-colored sepals) point sideways or downward rather than upward, and the lip is deeply fringed along the margin. Additionally, the Rose Pogonia has a leaf-like bract growing from the base of the flower which is not present in *Arethusa*.

**HABITAT IN MASSACHUSETTS:** *Arethusa* is found in open peaty wetlands, bogs, boggy meadows, and inter-dune swales, usually with cranberry, sphagnum moss, sundews, Rose Pogonia, sedges, and shrubs such as Sheep Laurel and Swamp Azalea. *Arethusa* prefers open, early successional habitats but may persist in the shade of the shrubs.



*Photo by Jennifer Garrett, NHESP*

**RANGE:** *Arethusa* is distributed from Newfoundland west to southern Manitoba, and south to Delaware, northern Indiana, and Minnesota. It is found sporadically further south in the Appalachian Mountains to South Carolina.

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**POPULATION STATUS:** Arethusa is classified as a Threatened species in Massachusetts. It is rare throughout its range except locally in Maine, the Great Lakes states, and eastern Canada. It has been extirpated from Delaware and Maryland. Populations of Arethusa apparently vary greatly in number of plants from year to year.

Currently (since 1990), there are 11 sites in Massachusetts where this species is known to occur. Historically (prior to 1990), it was known from an additional 87 locations. It is declining in apparently suitable habitat in inland bogs for reasons that are not known. The species does not appear to be declining as rapidly on the coastal boggy areas.

There are a number of known threats to its existence. Destruction of wetland habitat by drainage and conversion for other uses is reducing available habitat. Further loss of habitat is occurring through ecological succession of bogs and meadows to Red Maple swamps and shrub swamps. Coastal storms and hurricanes frequently eliminate habitat in the interdune swales but can create new habitat where dunes are undeveloped. Over-collection has also contributed to the scarcity of this native orchid.

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Massachusetts Division of Fisheries & Wildlife

## Few-seeded Sedge *Carex oligosperma* Michx.

State Status: **Endangered**  
Federal Status: **None**

**GENERAL DESCRIPTION:** Few-seeded Sedge is a grass-like, perennial herb of acidic peatlands that spreads via underground stems called rhizomes. Growing as tall as one meter, its stems are solitary or shortly spaced apart, sometimes forming large colonies. Few-seeded Sedge has tiny, wind-pollinated flowers that are borne in compact spikes at the summit of the stem. Each flower is unisexual and closely subtended by a small, flat scale that largely conceals it. The staminate (*i.e.*, pollen-bearing) flowers are subtended by a single scale. The carpellate (*i.e.*, ovule-bearing) flowers are subtended by two scales, an outer flat scale and an inner, sac-like scale, called a perigynium, that encloses the flower. In the Few-seeded Sedge, the uppermost spike bears only staminate flowers, while the one to three lower spikes bear only carpellate flowers.

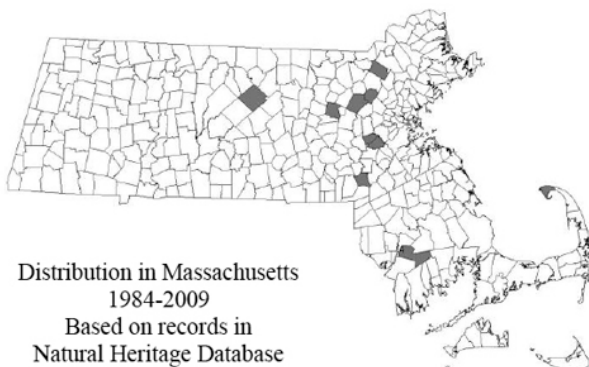
**AIDS TO IDENTIFICATION:** The Few-seeded Sedge belongs to a section of the genus *Carex* called the Vesicariae. Members of this section are characterized by three stigmas per flower (and subsequently three-sided achenes) and inflated perigynia, usually terminated by a two-toothed beak. Indeed, the perigynia of the Few-seeded Sedge do appear inflated, resembling small



Holmgren, Noel H. 1998. *The Illustrated Companion to Gleason and Cronquist's Manual*. New York Botanical Garden

bladders with a slender beak at the apex. The beak is terminated by two tiny teeth that require magnification to see. As its name implies, the Few-seeded Sedge has relatively few carpellate flowers per spike (3–15) compared to closely related species. The leaves of this sedge are very narrow, only 1–3 mm wide, wiry, and are curled in at the edges (involute).

**SIMILAR SPECIES:** There are several species in Massachusetts that resemble the Few-seeded Sedge. Two common and closely-related species that occur in wetlands include the Sallow Sedge (*Carex lurida*) and the Inflated Sedge (*Carex vesicaria*). Both have flat leaves that are usually wider than 3 mm, and they commonly have more cylindrical spikes than Few-seeded Sedge owing to the greater number of perigynia



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per spike. The Endangered Michaux's Sedge (*Carex michauxiana*), which also can be found in acidic peatlands, superficially resembles the Few-seeded Sedge, but can be distinguished by its flat or M-shaped leaves and essentially uninflated, beakless perigynia.

**HABITAT:** In Massachusetts, the Few-seeded Sedge occurs in both basin wetlands, such as bogs, and river/lake-side wetlands. Associated species include Rhodora (*Rhododendron canadense*), Three-way Sedge (*Dulichium arundinaceum*), Leatherleaf (*Chamaedaphne calyculata*), Silvery Sedge (*Carex canescens*), Woolgrass (*Scirpus cyperinus*), Swamp Candles (*Lysimachia terrestris*), Large Cranberry (*Vaccinium macrocarpon*), and Virginia Chain Fern (*Woodwardia virginica*).

**RANGE:** Few-seeded Sedge occurs from Newfoundland west to Alberta and south to North Carolina.

**POPULATION STATUS IN MASSACHUSETTS:**

Few-seeded Sedge is listed under the Massachusetts Endangered Species Act as Endangered. All listed species are protected from killing, collecting, possessing, or sale and from activities that would destroy habitat and thus directly or indirectly cause mortality or disrupt critical behaviors. This sedge is rare in Massachusetts because it is a cool-climate plant nearing the southern extent of its range; it is more abundant in the northern New England states. This sedge was once known from Connecticut, but is now believed to be historic or extirpated there.

**THREATS:** Threats to the Few-seeded Sedge are those that threaten the integrity of the natural communities it inhabits. These include changes in hydrology of the wetland (e.g., ditching, channelization, road construction) and invasive plant species such as Common Reed (*Phragmites australis*) and Purple Loosestrife (*Lythrum salicaria*). These two species are capable of replacing native vegetation in wetlands due to abundant seed production and vigorous vegetative growth. Recognition and control of invasive species will be important for maintaining relatively pristine habitats for rare plant species.

**MATURE PERIGYNIA PRESENT:**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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## Purple Milkweed *Asclepias purpurascens* L.

State Status: **Endangered**  
Federal Status: **None**

**DESCRIPTION:** Purple Milkweed (Family Apocynaceae) is an herbaceous perennial of open sparsely vegetated woodlands and borders. Unlike other milkweeds this species produces stems only from a confined crown, and does not “run”, or spread by rhizomes. The flowers are produced in one to two hemispherical umbels of showy, deep purple to reddish-magenta flowers from late June to August. Like other members of its family, it has milky sap or latex. The stems can be smooth or covered in minute down and are up to one meter (3.3 ft.) tall. The opposite, ovate-oblong to elliptic leaves are dark green and have a smooth upper surface and a pale, hairy lower surface. Flowers can produce two follicles (fruits) each, but typically only one or two are produced per umbel, if any fruit is set at all. Wind dispersal is enabled by the silky hairs attached to the seeds.

**RANGE:** Purple Milkweed can be found in much of the eastern half of the United States as far west as South Dakota and Texas. It also occurs in Southern Ontario. Despite the wide range, the numbers of populations are very low in all areas, except Iowa, Michigan, New Jersey, and New York.



*Photo: Pamela Polloni.*

*The terminal inflorescence and acute leaf tip (seen best on the furthest leaf) aid in identifying Purple Milkweed.*

**HABITAT IN MASSACHUSETTS:** Purple Milkweed is usually found on dry, fairly open road banks and in drier oak-pine woods and woodland borders. However, it is a facultative wetland species and has been found along scrubby lakeshores and in vernal pools.

**AIDS TO IDENTIFICATION:** The most prominent feature of this species is its large purple flowers with large tall upward pointing petal appendages, or hoods. Another diagnostic feature is its smooth downward pointing fruits. The leaves taper to a short petiole, 0.8 to 2.5cm (0.3 – 0.9 inches) long, and have an acute tip. Leaf mid-veins of this species are often pinkish. Additionally, inflorescences are generally terminal in Purple Milkweed.

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**SIMILAR SPECIES:** Purple Milkweed can be confused with Tall Milkweed (*Asclepias exaltata*), Common Milkweed (*Asclepias syriaca*), and Swamp Milkweed (*Asclepias incarnata*). Tall Milkweed, as its name suggests, is often taller, up to 2m (~6ft), and has whitish to greenish flowers. Swamp Milkweed has smaller flowers arranged in a flat cluster, and often has more pubescent upper leaf surfaces. Common Milkweed's flowers are lighter purple and its leaves are blunt ended with a distinct separate point, while Purple Milkweed leaves simply taper to a narrow tip. In fruit, Purple and Common milkweeds have reflexed peduncles (flowering stalks), while in Swamp and Tall milkweeds peduncles are erect. The smooth fruit of Purple Milkweed can be used to distinguish it from the warty fruit of Common Milkweed. An additional character for vegetative material is that the leaves of the Purple Milkweed are not as prominently pinnate-veined as those of Common milkweed. Tall and Purple milkweeds can be very difficult to distinguish from vegetative material, but generally Tall Milkweed has longer leaves; flowers or fruit may be necessary for conclusive identification.

#### FLOWERING TIME IN MASSACHUSETTS:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

#### FRUITING TIME IN MASSACHUSETTS:

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

**THREATS:** This is an early to mid-successional species; tree growth and the resulting reduction in light may contribute to mortality. One population in Massachusetts has been critically endangered by development. Some populations may be threatened by deer browsing. As the existing populations are small, failure of sexual reproduction due to self-incompatibility or inbreeding depression may also contribute to population decline.

#### POPULATION STATUS IN MASSACHUSETTS:

Purple Milkweed is listed as Endangered under the Massachusetts Endangered Species Act. All listed species are protected from killing, collecting, possessing, or sale and from activities that would destroy habitat and thus directly or indirectly cause mortality or disrupt critical behaviors. Historically, Purple Milkweed was found in all but Bristol and Plymouth counties. Current populations are only known from Barnstable and Hampshire counties.

#### MANAGEMENT RECOMMENDATIONS:

Documented populations need to be protected from the effects of development, succession, erosion and recreation. Lack of other individuals for cross pollination is an issue at one location; supplemental pollen may be needed for sexual reproduction. There should be quantitative monitoring undertaken at all known sites. All active management of rare plant populations (including invasive species removal) is subject to review under the Massachusetts Endangered Species Act, and should be planned in close consultation with the Massachusetts Natural Heritage & Endangered Species Program.

#### REFERENCES:

- Choberka, E.G., M.R. Penskar, and P.J. Higman. 2000. Special plant abstract for *Asclepias purpurascens* (purple milkweed). Michigan Natural Features Inventory, Lansing, MI. 2 pp. Available from: [http://web4.msue.msu.edu/mnfi/abstracts/botany/asclepias\\_purpurascens.pdf](http://web4.msue.msu.edu/mnfi/abstracts/botany/asclepias_purpurascens.pdf)
- Farnsworth, E.J., and M.J. DiGregorio. 2002. *Asclepias purpurascens* L. (Purple milkweed) Conservation and Research Plan. New England Plant Conservation Program, Framingham, Massachusetts, USA. Available from: <http://www.newfs.org/docs/pdf/Asclepiaspurpurascens.pdf>

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*Massachusetts Division of Fisheries & Wildlife*

**Cornel-leaved Aster  
*Doellingeria infirma*  
(Michx.) Greene**

State Status: **Endangered**  
Federal Status: **None**

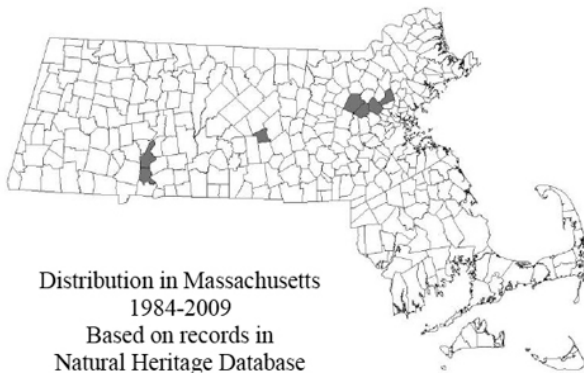
**DESCRIPTION:** The Cornel-leaved Aster (*Doellingeria infirma*) is a slender, erect, perennial herb of the aster family (Asteraceae). It grows from about one to three feet tall (4 to 11 decimeters) with a single, smooth, somewhat zig-zag stem. It has a somewhat flat-topped inflorescence of white “flowers,” which are actually composites (called “capitula”) of many smaller flowers. This species flowers from late July to September.

**AIDS TO IDENTIFICATION:** The Cornel-leaved Aster derives its Latin specific epithet *infirma* from its slender stem, which is “weak” relative to stouter asters. The leaves of this weak aster are 2 to 5 inches (6 to 13 cm) long, and are elliptical in shape. The margins are entire (not toothed) and are smooth except for pubescent veins beneath. The leaves are few in number, are alternately arranged, and are essentially the same size along the length of the stem. The flower heads (capitula) are about 1 inch (3 cm) across with 5-12 broad, white “rays.” In many members of the aster family, what



appear to be fringing petals are actually tiny flowers called “ray flowers” or “rays.” The capitula are arranged in a corymb-like (somewhat flat or round-topped) inflorescence. The fruit is a hairless achene (a small, dry fruit with a single seed) topped by two sets of bristles: a long inner whorl and a much shorter outer one.

**SIMILAR SPECIES:** There are several asters that superficially resemble the Cornel-leaved Aster, and therefore it is best to consult a technical manual when identifying asters. A few common, similar-looking, white asters that may be separated easily from the Cornel-leaved Aster include the Flat-topped White Aster (*Doellingeria umbellata*), and the Toothed White-topped Aster (*Sericocarpus asteroides*). The Flat-topped White Aster is a larger plant (10-20 dm) of lowlands. It has more copious leaves that are much rougher than the smooth leaves of the Cornel-leaved Aster. In addition, the achenes of the Flat-topped White Aster are sparsely pubescent, while those of the Cornel-leaved Aster are glabrous. The Toothed White-topped Aster has toothed leaves, smaller flower heads, and pubescent fruit.



Distribution in Massachusetts  
1984-2009  
Based on records in  
Natural Heritage Database

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**HABITAT:** Cornel-leaved Aster has been found on non-acidic, dry to dry-mesic, rocky, wooded slopes in partial shade. Species often associated with this aster include hickories (*Carya ovata* and *C. tomentosa*), oaks (*Quercus rubra* and *Q. alba*), tick-trefoils (*Desmodium* spp.) and goldenrods (*Solidago* spp.). In Massachusetts, this aster usually is found growing in woods with an open shrub layer and a moderately open tree canopy.

**RANGE:** The Cornel-leaved Aster ranges from Massachusetts west to Ohio, south to South Carolina, Georgia, and Alabama.

**POPULATION STATUS IN MASSACHUSETTS:**

The Cornel-leaved Aster is listed as Endangered under the Massachusetts Endangered Species Act. All listed species are protected from killing, collecting, possessing, or sale and from activities that would destroy habitat and thus directly or indirectly cause mortality or disrupt critical behaviors. In Massachusetts, this aster has been reported from Hampden, Worcester, and Middlesex Counties. Only four stations of this species are currently known in Massachusetts. This species was once known from Rhode Island, but is now considered historic in that state. One reason for its rarity in Massachusetts, and throughout our region, is that the species is near the northern limit of its range.

**MANAGEMENT RECOMMENDATIONS:** As for many rare species, the exact needs for management of the Cornel-leaved Aster are not known. The following comments are based primarily on observation of populations in Massachusetts. Invasive exotic plant species of forest understories, such as Japanese Barberry (*Berberis thunbergii*) or Common Barberry (*Berberis vulgaris*), may compete with this aster for resources. Invasive species should be controlled where they compete with rare species. Animal browse, likely by deer or rabbit, has been observed on this species of aster. Fencing enclosures to prevent browse may benefit this aster at certain locations. Given that the species typically occurs in dry, rocky places, the role of fire in maintenance of the species habitat or in stimulating its seed to germinate should be investigated. While the Cornel-leaved Aster may benefit from some canopy thinning, it likely requires a partially shaded habitat, and hence the extremes of dense shade or drastic canopy clearing should be prevented. All active management within the habitat of a rare plant population (including invasive species removal) is subject to review under MESA, and should be planned in close consultation with the Massachusetts Natural Heritage & Endangered Species Program.

**Flowers Present**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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Massachusetts Division of Fisheries & Wildlife

## New England Blazing Star *Liatris novae-angliae* (Lunell) Shinnery

State Status: **Special Concern**

Federal Status: **None**

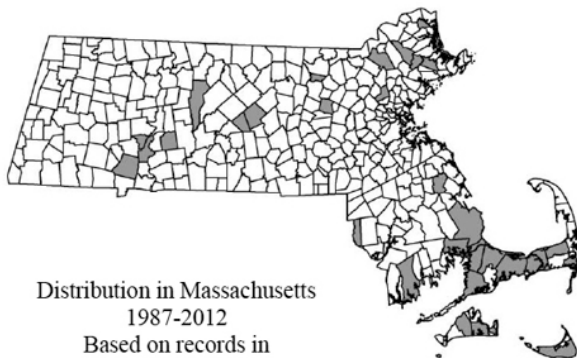
**DESCRIPTION:** New England Blazing Star (*Liatris novae-angliae*) is an endemic, globally rare perennial composite (family Asteraceae) of dry, sandy grasslands and clearings. It has showy purple flowers that bloom from late August to October.

**AIDS TO IDENTIFICATION:** New England Blazing Star grows up to 2.6 feet (80 cm) in height, and has numerous alternate, entire (hairless), and very narrow (0.4–2 inches; 1–2.5 cm) stem leaves. Flowers are purple, and are borne in heads, generally with 3 to 30 heads per plant. The heads are hemispheric in shape, and have stalks that range in length from very short (these heads are subsessile) to about 2 inches (5 cm). Flower heads have 20 to 80 flowers.

**SIMILAR SPECIES:** New England Blazing Star is the only native *Liatris* in Massachusetts. Two non-native species, Gayfeather (*L. pycnostachya*) and Dense Blazing Star (*L. spicata*) resemble the native species somewhat; Gayfeather and Dense Blazing Star, however both have flower heads that are completely sessile, that are more cylindrical than hemispheric in shape, and that



Photo by Jennifer Garrett, NHESP.



Distribution in Massachusetts  
1987-2012  
Based on records in  
Natural Heritage Database

have far fewer flowers per head (5–14). Knapweeds (genus *Centaurea*) can sometimes be confused by Blazing Star as well. Knapweeds often have brownish or black fringed involucre bracts (bracts below the flower head), and lobed or toothed leaves.

**HABITAT IN MASSACHUSETTS:** In Massachusetts, New England Blazing Star inhabits open, dry, low-nutrient sandy soils of grasslands, heathlands, and barrens. It thrives in fire-influenced natural communities

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that are periodically disturbed and devoid of dense woody plant cover. Associated species vary, but may include heaths (*Arctostaphylos uva-ursi*, *Gaylussacia* spp., *Vaccinium* spp.), Scrub Oak (*Quercus ilicifolia*), Bayberry (*Morella pensylvanica*), Little Bluestem (*Schizachyrium scoparium*), Wavy Hair-grass (*Deschampsia flexuosa*), Pennsylvania Sedge (*Carex pensylvanica*), and Butterfly Weed (*Asclepias tuberosa*).

**THREATS:** Threats to New England Blazing Star include development, exclusion of disturbance (or rather, the resulting encroachment of woody species and accumulation of a thick organic soil layer), indiscriminant use of herbicides, mowing during the growing season, deer browse, and trampling.

**RANGE:** This taxon is endemic to the northeastern United States and is only known from Connecticut, Maine, Massachusetts, New Hampshire, New York, Pennsylvania, and Rhode Island; it is rare throughout its range. New England Blazing Star is assumed to be extirpated from New Jersey.

#### POPULATION STATUS IN MASSACHUSETTS:

New England Blazing Star is listed under the Massachusetts Endangered Species Act as a species of Special Concern. All listed species are legally protected from killing, collection, possession, or sale, and from activities that would destroy habitat and thus directly or indirectly cause mortality or disrupt critical behaviors. New England Blazing Star is currently known from Barnstable, Dukes, Essex, Franklin, Hampden, Hampshire, Middlesex, Nantucket, Plymouth, and Worcester Counties, and is historically known from Bristol, Norfolk, and Suffolk Counties.

**MANAGEMENT RECOMMENDATIONS:** As with many rare species, the exact management needs of New England Blazing Star are not known. Research has shown that populations of New England Blazing Star expand with high frequency fire disturbance; however substitute disturbances such as mowing can maintain suitable habitat as well, provided it is done after the growing season (November through April), and that areas of open exposed soils are retained to aid seed establishment.

Sites should be monitored for over-shading caused by habitat succession to dense shrub or tree cover. Also, population sites should be monitored for exotic plant species invasions because the disturbed nature of high-quality New England Blazing Star habitat can make it susceptible to exotic species establishment. If trampling or erosion are threats in recreational areas, trails can be stabilized or re-routed. To avoid inadvertent harm to rare plants, all active management of rare plant populations (including invasive species removal) should be planned in consultation with the Massachusetts Natural Heritage & Endangered Species Program.

#### Flowering time in Massachusetts

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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Massachusetts Division of Fisheries & Wildlife

## Britton's Violet *Viola brittoniana* Pollard

State Status: **Threatened**  
Federal Status: **None**

**DESCRIPTION:** Britton's Violet (*Viola brittoniana*) is a low-growing, herbaceous perennial found within or at the edges of floodplains of freshwater rivers. It has variably dissected leaves, and purple flowers that bloom from the middle of May to early June.

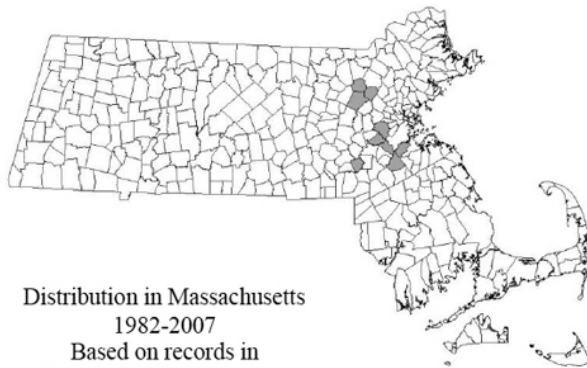
**AIDS TO IDENTIFICATION:** Britton's Violet grows 5 to 10 inches (12–25 cm) in height and has basal leaves arising directly from a rhizome. Two varieties of Britton's Violet (and their hybrids) are currently recognized and protected here: *V. brittoniana* var. *brittoniana* and *V. brittoniana* var. *pectinata*. (Some authors consider these taxa separate species; this question is currently under evaluation by NHESP). The nominate variety has consistently dissected leaves, usually deeply dissected into three lobes; the center lobe is usually further divided into three sublobes, and the lateral ones into three or four sublobes. In *V. brittoniana* var. *pectinata*, the leaves are narrowly to (increasingly through the season) broad-triangular and uncut but with long-toothed margins, especially toward the base. In both varieties, closed, self-fertilizing (cleistogamous) flowers appear above ground



Gleason, H.A. 1952. *The New Britton and Brown Illustrated Flora of the Northeastern United States and Adjacent Canada*. New York: Botanical Garden/Hafner Press, NY.

but below the taller leaves during June and July. Fruits produced from both flower types are similar, round to ovoid dark tan capsules that become upright and split into three parts when mature. Forcible ejection of the seeds has been observed up to 9 feet (3 m) from the plant. Seeds are further dispersed by ants.

**SIMILAR SPECIES:** Several other violets occur intermingled with or near Britton's Violet populations. Bird's Foot Violet (*V. pedata*) is the only other species with deeply dissected leaves. In this species, leaves are divided into as many as 15 narrow segments. Leaves of other violets with purple flowers have different leaf morphology: Marsh Blue Violet (*V. cucullata*) has heart-shaped unlobed leaves; Early Blue Violet (*V. palmata*) has shallowly-lobed leaf sinuses; Arrow-leaved Violet (*V. sagittata*) has oblong to triangular leaves often with only basal lobes; Woolly Blue Violet (*V. sororia*) has kidney-shaped leaves. The nominate variety of Britton's Violet is known to hybridize with Marsh Blue Violet,



Distribution in Massachusetts  
1982-2007  
Based on records in  
Natural Heritage Database

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Woolly Blue Violet and Arrow-leaved Violet; hybrids have unlobed early-season leaves and lobed later-season leaves.

**HABITAT IN MASSACHUSETTS:** In Massachusetts, Britton's Violet is found mostly between the upper part of the annually flooded zone and the 100-year flood line of freshwater rivers. The U.S. Fish and Wildlife Service classifies it as a facultative wetland species (FAC), indicating that it occurs equally often in wetland or upland areas of the floodplain. The wetlands are generally wet meadows. This terrestrial species occurs in two distinct habitats in Massachusetts: within mowed areas and along woodland trails (generally whose edges are occasionally mowed or cleared). The species is rare in Massachusetts because most of the suitable habitat has been altered by fill for development, floodplain diking, or conversion to or from agriculture.

**THREATS:** Threats to Britton's Violet include disruptions to the natural hydrologic regime, changes in water quality due to sedimentation, trampling, and over-shading or competition from aggressive native and exotic invasive species. Glossy Buckthorn (*Frangula alnus*) is an exotic invasive species of particular concern at Britton's Violet habitat locations.

**RANGE:** The limited range of Britton's Violet extends from Massachusetts, Connecticut, and New York south to the Carolinas. It is also tracked as a rare species in Connecticut, New York, Pennsylvania, North Carolina, and Virginia.

**POPULATION STATUS IN MASSACHUSETTS:** Britton's Violet is listed under the Massachusetts Endangered Species Act as Threatened. All listed species are legally protected from killing, collection, possession, or sale, and from activities that would destroy habitat and thus directly or indirectly cause mortality or disrupt critical behaviors. It is currently known from Middlesex, Norfolk, and Suffolk Counties, and is historically known from Plymouth County.

**MANAGEMENT RECOMMENDATIONS:** As with many rare species, the exact management needs of Britton's Violet are unknown. This species apparently does not compete well in successional areas; germination occurs in recently disturbed areas, but plants die out as taller native and exotic species become established. Successful management may include periodic mechanical removal of dense competing vegetation, and targeted treatment for particularly insidious invasive species. All active management of rare plant populations (including invasive species removal) should be planned in consultation with the Massachusetts Natural Heritage & Endangered Species Program to avoid inadvertent damage to rare species.

#### Petaliferous (Chasmogamous) Flowers Present in Massachusetts

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

#### Cleistogamous Flowers Present in Massachusetts

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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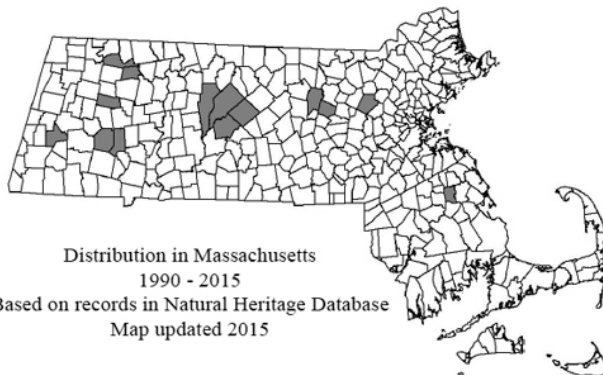
## Twelve-spotted Tiger Beetle *Cicindela duodecimguttata*

State Status: **Special Concern**  
Federal Status: **None**

**DESCRIPTION:** Tiger Beetles are so named because of their “tiger-like” behavior of chasing down and capturing prey with their long mandibles. The Twelve-spotted Tiger Beetle (*Cicindela duodecimguttata*) is 12-15 mm in length (Pearson et al. 2006). It is dark brown in color with a metallic sheen, the elytra (wing covers) marked with white maculations (spots and bands). The Bronzed Tiger Beetle (*Cicindela repanda*) resembles the Twelve-spotted Tiger Beetle, although the Bronzed Tiger Beetle is smaller on average, a lighter shade of bronzed brown, and the elytra are marked with maculations that are more complete (the bands are less broken into spots). In addition, the Twelve-spotted Tiger Beetle has a thorax that is trapezoidal in shape (wider anteriorly than posteriorly), while the thorax of the Bronzed Tiger Beetle is cylindrical.

**HABITAT:** Open areas with silty or sandy soil, typically in or near wetlands; particularly stream and river banks and lake and pond shores. Adult beetles may be found in anthropogenic habitats such as old sand pits and sand roads, particularly in or near wetlands. Larval habitats typically consist of eroding stream and river banks (Knisley & Schultz 1997).

**LIFE HISTORY:** The Twelve-spotted Tiger Beetle has a



*Cicindela duodecimguttata* • MA: Worcester Co., Hardwick • 14 Aug 2007 • Photo by M.W. Nelson

### Adult Activity Period in Massachusetts

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

two-year life cycle. Adult beetles emerge in late summer, overwinter, and are active again in spring and early summer. In Massachusetts, mating and egg laying occur in May and June. A few adults may survive into early July. Larvae develop through the first summer and autumn, overwinter, and continue development the following spring and summer, emerging as adults in August of the second year.

**GEOGRAPHIC RANGE:** The Twelve-spotted Tiger Beetle is widely distributed across much of North America, from Newfoundland and Labrador south to Georgia, and west to Alberta and Texas (Pearson et al. 2006). The Twelve-spotted Tiger Beetle occurs throughout most of mainland Massachusetts, although there are no recent records from the northeastern part of the state or more southeast than the Town of Hanson.

*A Species of Greatest Conservation Need in the Massachusetts State Wildlife Action Plan*

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Colonies are localized, restricted to areas of suitable habitat.

**STATUS AND THREATS:** The Twelve-spotted Tiger Beetle is threatened by hydrologic alteration that disrupts natural seasonal flooding and deposition of silt and sand in its habitat. Other potential threats include invasion by exotic plants, eutrophication or other water pollution, river bank stabilization, aerial insecticide spraying, and off-road vehicles.

**Literature Cited**

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- Pearson, D.L., C.B. Knisley, and C.J. Kazilek. 2006. *A Field Guide to the Tiger Beetles of the United States and Canada*. Oxford University Press, New York, New York. 227 pp.

*Authored by M.W. Nelson, NHESP Invertebrate Zoologist, April 2015*

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## Mocha Emerald *Somatochlora linearis*

State Status: **Special Concern**

Federal Status: **None**

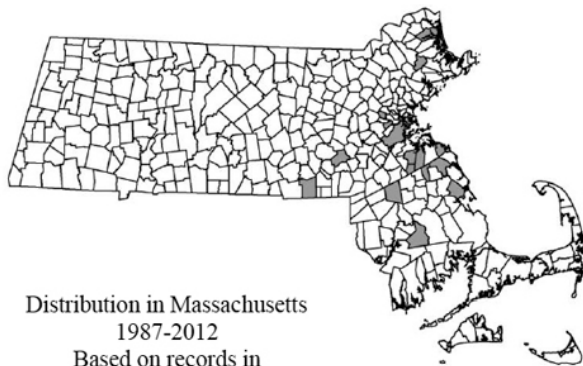
**DESCRIPTION:** The Mocha Emerald (*Somatochlora linearis*) is a large, elongate insect of the order Odonata, sub-order Anisoptera (the dragonflies), and family Corduliidae (the emeralds). Emeralds of the genus *Somatochlora* are generally large, dark dragonflies with at least some iridescent green coloration, brilliant green eyes in the mature adults (brown in young individuals), and moderate pubescence (hairiness), especially on the thorax. The Mocha Emerald is distinctive among the *Somatochlora* of Massachusetts in completely lacking markings on the thorax (section behind the head). The face is mostly yellowish brown with a brown band across the middle. The forehead is metallic green. The large eyes, which meet at a seam on the top of the head, are brilliant green in mature adults. The thorax is a chocolate color (mocha) with some metallic green highlights. The cylindrical abdomen (located behind the thorax) is most narrow at the base, widening to segment four (dragonflies and damselflies have ten abdominal segments) and then narrowing slightly toward the distal end. The abdomen is black with a brownish yellow lateral (on the side) spot at the proximal end (closest to the thorax) of segments three through ten. The first



segment has a large brownish yellow spot also positioned laterally and proximally. The wings of this species are transparent, though washed with brown or amber color, usually more extensive in females. As in all dragonflies and damselflies, the wings are supported by a dense system of dark veins. When at rest, the Mocha Emerald hangs vertically from the branches of bushes and trees, with the wings extended out horizontally, like those of an airplane.

Adult male Mocha Emeralds range from 2.3 to 2.4 inches (58.5 to 61 mm) in length. Females range from 2.6 to 2.7 inches (65.5 to 68.25 mm) in length. Although the females are larger, both sexes are similar in coloration and body form.

**SIMILAR SPECIES:** Mocha Emeralds can be easily distinguished from other species of the genus *Somatochlora* in Massachusetts by the complete lack of



Distribution in Massachusetts  
1987-2012  
Based on records in  
Natural Heritage Database

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thoracic markings, elongate body form (especially in the females), and the abdominal spotting described above. Male Mocha Emeralds have distinctive bifurcate terminal abdominal appendages (as shown in Needham et al. (1999) and Nikula et al (2007)) that distinguish it from all other species in Massachusetts. Females of this species can be told by the shape of their vulvar lamina (as shown in Needham et al., 1999). Determination of these two characters is the most accurate means of identifying this species, though a hand lens or microscope is necessary for viewing their distinguishing characteristics. Williamson's Emerald (*S. williamsoni*) and Clamp-tipped Emerald (*S. tenebrosa*) are most similar to the Mocha Emerald. However, these two species may be distinguished from the Mocha Emerald by their thoracic stripes and by their distinctive terminal abdominal appendages (males) and vulvar lamina (females) (Needham et al. 1999). The nymphs can be identified by characteristics of the cerci and epiproct as per the keys in Needham et al. (1999) and Soltesz (1996).

**HABITAT:** In Massachusetts, the Mocha Emerald has been found most often away from breeding habitats in fields and forest clearings. However, many of these areas are adjacent to habitats that, based on observations elsewhere in this species' range, are appropriate breeding sites for the Mocha Emerald. Breeding sites for this species are small to medium-sized streams that flow through woods or swamps. At one Massachusetts site, males were found patrolling over puddles along a wooded, dirt road. A sand or gravel bottom may be an important habitat characteristic, since females prefer to oviposit in this type of substrate.

**LIFE HISTORY/BEHAVIOR:** The Mocha Emerald has been recorded in Massachusetts from early July through mid-August. Information from nearby areas for this species extends the flight season from late June through early September. Although little has been published about the life cycle of the Mocha Emerald in particular, information documented for other dragonfly species is most likely applicable. During their complete life cycle, dragonflies go through two distinct stages, a nymph stage where they are wholly aquatic, and an aerial adult stage.

The nymph of the Mocha Emerald may be found clinging to the roots of sedges or other plants growing in the water where it waits until a potential meal comes

within reach. Dragonfly nymphs are obligate carnivores, feeding on just about any animal of appropriate size, including a wide variety of aquatic insects, small fish, and tadpoles.

Full development of the nymph generally takes about a year, but may take longer in some species (5 or more years). When fully developed (with the adult still inside of the last nymphal skin), the Mocha Emerald crawls up onto grasses or other emergent vegetation, usually no more than a foot above the water, to emerge. When the dragonfly has found a sturdy substrate to cling to, the adult begins to push itself out of the nymphal exoskeleton, head and thorax first and then the abdomen. Immediately following emergence, the adult is very compacted, especially the wings and abdomen. As soon as the abdomen and wings are fully expanded, the adult takes its first flight. This maiden flight usually carries the individuals up into surrounding forests or other areas away from water, where it spends time maturing and feeding and is protected from predators and inclement weather.

Adult Mocha Emeralds can be found in fields and forest clearings which they patrol in search of small aerial insects, such as flies and mosquitoes, on which they feed. The adult coloration is acquired and the dragonfly becomes sexually mature, usually in about a week, before returning to the breeding habitat to initiate mating.

Breeding in Massachusetts probably occurs from early July through August, as in other regions where this species occurs. At the breeding habitat, male dragonflies spend most of their time patrolling up and down the stream in search of females and driving off competing males. Upon locating a female, a male will grasp her thorax with his legs and secure her by the back of the eyes with his terminal abdominal appendages. A receptive female swings the tip of her abdomen, where her reproductive organs are located, towards the male's hamules (secondary sexual organs), located on the underside of the second abdominal segment. The familiar heart-shaped "wheel position" is thus formed with the male on top and the female below. The joined pair quickly flies off into the surrounding upland habitat to mate. Following mating, oviposition (egg-laying) occurs. Females of the genus *Somatochlora* oviposit alone and deposit their eggs directly into the substrate by tapping the tip of the abdomen on its surface.

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Mocha Emeralds are known to prefer to oviposit in shallow portions of the stream where the substrate is fine gravel or sand. Females fly back and forth over such an area tapping the substrate or water with the tip of her abdomen, depositing the eggs. Due to the shallowness of these areas, they may dry up soon after oviposition occurs. For this reason, eggs must be able to survive periods of drought.

**RANGE:** The Mocha Emerald is distributed throughout the eastern United States from Massachusetts south to Florida and west to Michigan, Iowa and Texas. In New England, the Mocha Emerald is recorded from Connecticut and Rhode Island, north only to Massachusetts.

**POPULATION STATUS IN MASSACHUSETTS:**

The Mocha Emerald is listed as a Species of Special Concern in Massachusetts. As with all species listed in Massachusetts, individuals of the species are protected from take (picking, collecting, killing, etc...) and sale under the Massachusetts Endangered Species Act. The species is known from about nine locations, all confined to eastern Massachusetts. The limited distribution of the Mocha Emerald here may be due to the fact that Massachusetts represents the northern limit of its range.

**MANAGEMENT RECOMMENDATIONS:** As for many rare species, exact needs for management of the Mocha Emerald are not known. As an inhabitant of streams, the Mocha Emerald may be vulnerable to impacts such as damming and flow alteration. Other impacts on aquatic systems such as chemical pollution pose a threat to the Mocha Emerald and all dragonflies and damselflies. The adults may also be particularly vulnerable in upland areas away from the breeding site, where they spend up to a week feeding and maturing. Maintaining natural uplands for feeding and roosting is a key part of protection of this species.

**Mocha Emerald Flight Period**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

**REFERENCES:**

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*Massachusetts Division of Fisheries & Wildlife*

**Blue-spotted Salamander  
*Ambystoma laterale***

State Status:

**Threatened** (Pop. 2; Bristol/Plymouth counties)

**Special Concern** (Pop. 1: remainder of state)

Federal Status: **None**

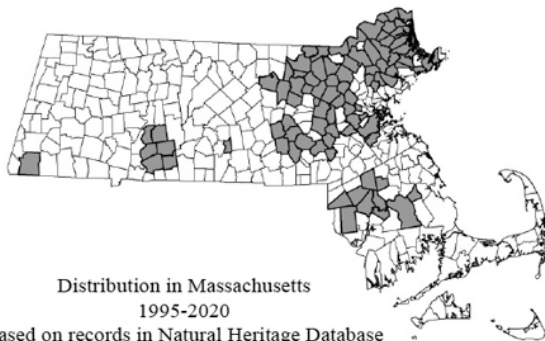
**DESCRIPTION:** Blue-spotted Salamander is a medium-sized salamander with conspicuous markings of randomly distributed, sky-blue spots, blotches, and flecks on a base color of dark gray to black. While the blue markings are abundant over the entire body in juveniles, they tend to be more concentrated along the sides and on the limbs in adults. Adults measure 3–5 inches (7.5–13 cm) in total length. The tail is laterally compressed (especially in sexually active males) and is proportionally longer in males than in females. Blue-spotted Salamander is in the family of mole salamanders, and so it has distinctively long toes and a stockier build relative to other groups of salamanders in our region.

Larvae have bushy, external gills and a broad caudal fin that extends well onto the back. Young larvae are not easily distinguished from those of other *Ambystoma* species. Older larvae can still be difficult to identify, but they are generally characterized as brownish with a yellowish lateral stripe, whitish/unpigmented undersides, and a heavily dark-mottled caudal fin.



Blue-spotted Salamander  
Photo by Leo P. Kenney

**SIMILAR SPECIES:** Blue-spotted Salamander is a member of an intricate group of salamanders known as the *Ambystoma jeffersonianum* complex. In Massachusetts, the complex consists of two bisexual species, Jefferson Salamander (*A. jeffersonianum*) and Blue-spotted Salamander, and a group of unisexual *Ambystoma* of a hybrid lineage. Unisexual *Ambystoma* in this complex have variable nuclear genomes consisting of complements of both Blue-spotted Salamander and Jefferson Salamander, and a mitochondrial genome derived from Streamside Salamander (*A. barbouri*), a species currently occurring in Kentucky, Ohio, Indiana, Tennessee and West Virginia. The original species pairing that led to the hybrid unisexual lineage is not yet known, but studies suggest that today's unisexual *Ambystoma* and *A. barbouri* from western Kentucky share a maternal ancestor from ~5 million years ago. The unisexual *Ambystoma*, whose populations almost always consist entirely of females, co-occur with local populations of genetically pure Blue-spotted Salamanders and Jefferson Salamanders and are able to perpetuate through complicated reproductive mechanisms involving the use



Distribution in Massachusetts  
1995-2020

Based on records in Natural Heritage Database  
Map updated 2020

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of sperm from males of either of those two species. The resulting offspring are unisexuals having varying ploidy levels (usually 3-4 sets of chromosomes, but occasionally 2 or 5) and varying complements of *A. jeffersonianum* vs. *A. laterale* nuclear genomes (depending on which of the species is present at a given site, and which reproductive mechanism plays out for a given egg). Unisexuals are not recognized as distinct species or subspecies; rather, they are considered hybrid forms of whatever species with which they are breeding. Across the entire geographic range of the lineage, unisexual *Ambystoma* are known thus far to breed with 5 different mole salamander species.

Unisexual *Ambystoma* are very similar in appearance to pure forms of Blue-spotted Salamander and Jefferson Salamander, falling somewhere within a continuum between the black base color, prominent blue spots/blotches, and narrow snout of pure Blue-spotted Salamanders, to the grayish-brown coloration, diffuse blue flecks, and wide snout of pure Jefferson Salamanders. The pure vs. unisexual forms of Blue-spotted Salamander can often (but not always) be distinguished in the field by size and coloration; adult unisexuals tend to have a gray to gray-brown base color (instead of jet black) and are noticeably larger (typically  $\geq 70$  mm snout-vent-length,  $\geq 7$  g) than pure Blue-spotted Salamanders (typically  $\leq 60$  mm,  $\leq 6$  g).



Unisexual (top) and pure (bottom) forms of Blue-spotted Salamander.  
Photo by Jacob E. Kubel

Some people confuse the lead/gray color phase of Eastern Red-backed Salamander (*Plethodon cinereus*) for Blue-spotted Salamander. However, Eastern Red-

backed Salamander is much leaner in overall appearance and, although it has a rather uniform peppering of minute, light-colored flecks along its lower sides, the pattern is quite inconspicuous relative to the larger, bolder, randomly distributed spots/blotches of Blue-spotted Salamander. An easy way to tell the two species apart, though, is to examine the toes. They are very short and stubby in Eastern Red-backed Salamander, but long and fingerlike in Blue-spotted Salamander.

**RANGE:** Blue-spotted Salamander is largely restricted to glaciated areas of North America. The species ranges from Newfoundland, Quebec, and the Maritime Provinces south to northern New Jersey and west to eastern Iowa, Minnesota, and southeastern Manitoba. Within Massachusetts, Blue-spotted Salamander is distributed primarily throughout Essex, Middlesex, and eastern Worcester counties. Scattered populations occur in the Brookfields and in Norfolk, Plymouth, northern Bristol, eastern Hampden, and eastern Hampshire counties. Only five populations west of the Connecticut River have been confirmed (all in Sheffield). Populations of Blue-spotted Salamander in Bristol and Plymouth counties appear to consist exclusively of the genetically pure form, representing a very rare population type in the eastern United States. Elsewhere in Massachusetts, all populations are presumed to contain both pure and unisexual individuals, with the latter often predominant.

**HABITAT:** Adult and juvenile Blue-spotted Salamanders inhabit relatively mature deciduous and mixed deciduous-coniferous forests and woodlands with sandy to loamy soils. In Massachusetts, lowlands are preferred, often in association with former glacial lakes, glacial deposits, extensive swamp forests (cedar or maple), and swampy or marshy river floodplains. Vernal pools, shrub swamps, wooded swamps, and riverine swamps and marshes are used by adults for breeding and by larvae for growth and development. Although there is considerable variability among individual wetlands known to be used in Massachusetts, Blue-spotted Salamanders seem to prefer those having relatively long hydroperiods, dark water, and moderate to high densities of multi-stemmed shrubs (especially *Cephalanthus occidentalis*). In some situations, dense emergent vegetation also seems important. Abundant detritus and absence of predatory fish (or presence of dense vegetation providing refuge from fish) are additional characteristics of typical breeding sites.

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A typical buttonbush shrub swamp used by Blue-spotted Salamander.  
Photo by Jacob E. Kubel

In the terrestrial environment, thick leaf litter, abundant coarse woody debris, loose soils, predominantly closed-canopy tree cover, and abundant rodent tunnels are trademarks of good-quality microhabitat for Blue-spotted Salamanders. Most adult individuals reside within several hundred meters of their breeding wetland. Data from one site in Massachusetts suggest that approximately half of adults inhabit forest >100 m away from the breeding wetland, with females wintering disproportionately farther from the wetland than males. Other research suggests that local salamander distribution around a breeding site may be influenced by habitat integrity, with salamanders residing closer to a wetland (on average) in intact forest, but occupying areas farther from the wetland when a forest patch is fragmented (e.g., by development). Of course, variability in the distribution of high-quality microhabitat around a breeding site is also likely to influence the distribution of individual salamanders around the wetland.

**LIFE CYCLE/BEHAVIOR:** As the family name “mole salamander” implies, adult and juvenile Blue-spotted Salamanders spend most of their time underground or hidden beneath rocks, logs, leaf litter, or other debris. During rainy or otherwise humid nights in warmer months of the year, individuals may occur on the ground surface for purposes of foraging, dispersal, or migration to breeding sites. However, most time is spent under leaf litter, in rodent tunnels, or in other subsurface cavities. Winters are spent below the frost line, presumably in vertical rodent tunnels or root channels, as has been observed in other mole salamanders.

Sometime between late February and early April (depending on the timing of winter thaw and warm rains in a given region and year), adult Blue-spotted Salamanders emerge from their underground retreats and migrate en masse to their breeding wetlands. Breeding migrations are typically triggered by a steady rain with ambient air temperature holding above 40°F. Given those conditions, salamander movement may begin shortly after sunset and continue through the night, with peak activity occurring between an hour after sunset and midnight. Not all individuals can complete their journey in a single evening. Therefore, migrations may occur over the course of several nights to a couple of weeks, depending on the timing, duration, and frequency of suitable weather conditions. If nocturnal rains are slow to materialize during the normal migratory period, the salamanders may settle for drizzle or a low fog, or even migrate beneath the cover of leaf litter (still moist from snowmelt or ground thaw).

Once in their breeding wetland, Blue-spotted Salamanders engage in an elaborate courtship similar to that of Jefferson Salamander. Various stages may be repeated or abandoned multiple times when a female is not receptive to a male, or when competing males disrupt or otherwise interfere with one another, but courtship generally proceeds as follows. The male Blue-spotted Salamander approaches a female, orients his body perpendicular to hers, and nudges her side with his snout several times. He then swims over the female, clasps her body behind her forelegs (with his own), and holds her for several minutes. During that time, the two salamanders may swim about as a clasped pair or just rest on the pool bottom. Eventually, the male (while clasping the female) begins rubbing his chin over her snout in a side-to-side motion and vibrates or rubs his hind limbs along her sides. He then releases the female, moves forward while vibrating his body, and arches and undulates his tail. She follows and noses his cloaca. The male then deposits one to several spermatophores on the bottom substrate of the wetland. The female moves over the spermatophore and picks up its seminal fluid (or even the entire spermatophore) with her cloacal lips, drawing it into her body.

In the pairing of males and females of the pure form, reproduction proceeds via normal fertilization of the eggs by the sperm obtained from the spermatophore(s) (i.e., syngamy of haploid gametes). However, in the pairing of males with females of the unisexual form,

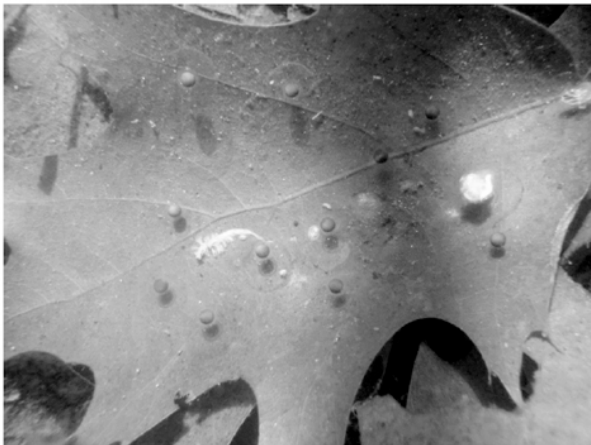
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reproduction proceeds via any of several possible mechanisms (collectively termed kleptogenesis) that do not involve traditional syngamy. Most commonly, the unisexual produces unreduced, polyploid ova, and the male's sperm merely activates embryonic development in the eggs without contributing any genetic material, thereby resulting in offspring that are essentially genetic clones of the unisexual mother. That unisexuals never produce offspring of the pure form is one reason why unisexual *Ambystoma* are believed to predominate in most local populations.

After mating, a female Blue-spotted Salamander may deposit her eggs singly or in small clusters nested within a loose, clear, gelatinous matrix (egg mass). Salamanders of the pure form always deposit eggs singly, whether in isolation or in small groups of 2-5 eggs deposited consecutively, side-by-side. Salamanders of the unisexual form, however, deposit eggs singly or in masses. The masses typically contain 5–15 eggs each, though some may contain as few as 2 or as many as 30 eggs. In both forms eggs and egg masses are usually attached to the twigs of submerged shrubs or to leaves, twigs, and other detritus on the bottom of the wetland. Eggs may also be attached to submerged grass blades or simply scattered on the bottom substrate. Blue-spotted Salamanders tend to produce up to several hundred mature ova, and so a single individual can account for multiple egg masses found at a wetland.



Blue-spotted Salamander eggs at the bottom of a vernal pool.  
Photo by Jacob E. Kubel

Hatching occurs in 3–4 weeks, whereupon the bushy-gilled, fully-aquatic larvae spend the next 2–3 months in the wetland. The salamander larvae feed voraciously on zooplankton, insect larvae (e.g., mosquitoes), and other aquatic organisms, increasing in body size and developing front and hind limbs as spring advances into summer. Metamorphosis then occurs in July or August, depending on when the wetland begins to dry, when food resources become limited, or on other factors. At this time, the larvae develop lungs, resorb their gills, and seek cover beneath stones, woody debris, leaf litter, or other detritus in moist or saturated portions of the wetland basin. There, the juvenile salamanders will wait for an opportunity to leave the basin and disperse into the surrounding forest (typically during an evening rain).

Following dispersal from natal wetlands, juvenile salamanders will reside in the forest, feeding on snails, earthworms, beetles, and other small invertebrates. Upon reaching sexual maturity in approximately 2 years, most individuals will return to their natal wetland to breed, starting the cycle anew. Others will have sought out new ground, joining another segment of the local breeding population, or pioneering a new one of their own.

Maximum life expectancy of Blue-spotted Salamander is unknown. Mark-recapture studies of other mole salamanders indicate that adult survivorship is relatively high, and individuals may live for several years or more with regularity. Accounts of salamanders held in captivity suggest a possible lifespan greater than 10 years.

#### **POPULATION STATUS IN MASSACHUSETTS:**

Blue-spotted Salamander (including the unisexual form) is legally protected pursuant to the Massachusetts Endangered Species Act (M.G.L. c. 131A) and implementing regulations (321 CMR 10.00); populations in Bristol and Plymouth counties are listed as Threatened, whereas populations everywhere else in the state are listed as Special Concern. As of January 2020, approximately 160 local populations have been documented among 86 towns since 1995. Primary threats to Blue-spotted Salamander in Massachusetts are habitat loss, habitat degradation, road mortality, and emerging infectious disease. The most common types of habitat loss are the clearing of forests and the filling (or draining) of vernal pools during residential, commercial, industrial, mining, or agricultural development. Habitat degradation typically occurs when development

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fragments habitat (e.g., creates gaps between forest habitat and breeding wetlands), chemical applications (e.g., pesticides, deicing salts, fertilizers) pollute breeding wetlands, or commercial logging operations disrupt forest ecology (e.g., compact soils, reduce leaf litter, introduce or increase growth of non-native, invasive vegetation). High road densities and traffic volumes tend to result in increased levels of adult salamander mortality; in extreme cases, road mortality functions as a barrier between upland and breeding habitats. Known and potential impacts of several pathogens/emerging infectious diseases (e.g., ranavirus, *Batrachochytrium salamandrivorans*) are not completely understood, but outbreaks could result in severe and widespread salamander mortality.

**MANAGEMENT RECOMMENDATIONS:** At a local scale, sites of known occurrence of Blue-spotted Salamander should be managed to develop or maintain mature forest conditions within approximately 1,000 feet of confirmed and potential breeding wetlands. Such management should aim to minimize forest loss/fragmentation, road traffic, soil compaction, and introduction/growth of invasive, non-native vegetation. Forest type should be maintained as deciduous or mixed deciduous-coniferous. Fallen trees, branches, leaves, and other detritus should be allowed to accumulate on the forest floor. Hydrology of breeding wetlands should not be altered in ways that might reduce hydroperiod within the March through August time period. Breeding wetlands should be protected from chemical pollution, and basin structure should not be altered without special permits from the Massachusetts Division of Fisheries and Wildlife and/or the Department of Environmental Protection. Breeding wetlands should not be filled or used for dumping of yard waste or refuse.

At the landscape scale, area of mature upland forest between local populations of Blue-spotted Salamander should be maximized to maintain dispersal corridors and, therefore, genetic exchange between populations. Land acquisition/protection efforts for maintaining habitat connectivity should prioritize areas with low road densities and traffic volumes. A land-protection strategy may best serve long-term persistence of local populations where they occupy relatively large, connected areas containing abundant breeding habitats. However, lands supporting small, peripheral, or isolated populations are also worth protecting for maintenance of genetic diversity at the state level.

Populations of Blue-spotted Salamander that do not contain unisexual *Ambystoma* are very rare in Massachusetts (and in the eastern United States, in general). Therefore, identification and protection of these “pure populations” is considered a high conservation priority. Biological inventory, research, land acquisition, and environmental regulation are several actions that should be utilized to help meet that goal.

Stronger controls are necessary to guard against the introduction and spread of amphibian pathogens and infectious disease. For example, national policy and enforcement regarding importation of exotic wildlife in the global pet trade should be improved to reduce and minimize the volume of diseased animals entering the country. Within Massachusetts, field biologists, anglers, and other outdoor enthusiasts should adopt and promote appropriate equipment-sanitation procedures when outdoor activities span wide geographic areas. A statewide amphibian monitoring program that includes sampling for pathogens and disease outbreaks is needed.

Active management of Blue-spotted Salamanders and their habitats is a developing interest. For example, construction of vernal pools to enhance breeding opportunities at sites where wetland habitats are scarce is a continuing line of research. Citizens play an active role in conservation by helping adult salamanders cross roads safely during their breeding migrations, thereby increasing survivorship and reproductive output.



Blue-spotted Salamanders are not readily visible to motorists when crossing roads. Photo by Jacob E. Kubel

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Citizens are encouraged to assist with conservation of Blue-spotted Salamanders in additional ways. For example, observations of Blue-spotted Salamanders should be reported to the NHESP, as land-protection efforts for the species are dependent on knowing where local populations occur. Collection and submission of data for the certification of vernal pool habitat is another beneficial action, as it indirectly affords certain legal protections to salamander habitats.

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Massachusetts Division of Fisheries & Wildlife

## Blanding's Turtle *Emydoidea blandingii*

State Status: **Threatened**  
Federal Status: **None**

**DESCRIPTION:** The Blanding's Turtle is a mid-sized turtle ranging between 16 and 22 cm (6-9 in.) in shell length. Its high-domed carapace (top shell) is dark and covered with pale yellow flecking. The lower shell (plastron) is yellow with large black blotches on the outer posterior corner of each scute (scale). The plastron is hinged, allowing movement; however, the shell does not close tightly. In older individuals, the entire plastron may be black. The most distinguishing feature is its long yellow throat and chin, which makes it recognizable at a distance. Males have slightly concave plastrons; females have flat plastrons. The tails of males are thicker and their cloacal opening (the common orifice of the digestive, reproductive and urinary systems) is located beyond the edge of the carapace. Hatchlings have a brown carapace and brown to black plastron, and range between 3.4 and 3.7 cm (1.3-1.5 in.) in length.

**SIMILAR SPECIES:** This species could be confused with the Eastern Box Turtle (*Terrapene carolina*). The Eastern Box Turtle can have a yellow chin, but lacks the yellow throat and neck. Box Turtles are smaller, 10-18 cm (4-7 in.) in shell length. In addition, the Box Turtle has a prominent mid-line ridge (keel) on the carapace,

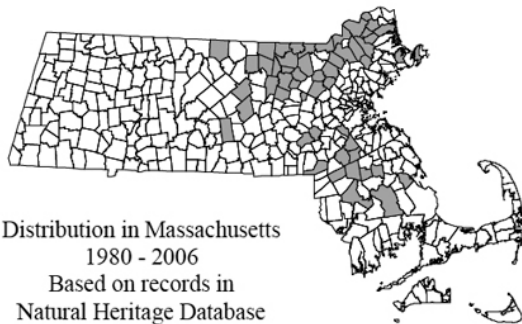


Photo by Susan Speaks

which is absent on Blanding's Turtles. The Blanding's Turtle may also be confused with the Spotted Turtle. However, the Spotted Turtle is much smaller, 3.5-4.5 inches in length and has very distinct round yellow spots.

**HABITAT IN MASSACHUSETTS:** Blanding's Turtles use a variety of wetland and terrestrial habitat types. Blanding's Turtles have been observed in seasonal pools, marshes, scrub-shrub wetlands, and open uplands (Sievert et al. 2003). Habitat use appears to vary according to the individual and the amount of precipitation, with more upland utilization during dry years (Joyal et al. 2001). Wetlands are used for overwintering during their inactive season (Nov-Mar).

**RANGE:** The Blanding's Turtle is found primarily in the Great Lakes region, extending to Kansas. Several smaller, disjunct populations occur in the East: in southern Nova Scotia, in an arc extending from eastern Massachusetts through southeastern New Hampshire to southern Maine, and in the lower Hudson Valley of New

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York. These populations (with the exception of those in New Hampshire) are all listed as Threatened or Endangered at the state or provincial level.

**LIFE CYCLE & BEHAVIOR:** Blanding's Turtles overwinter in organic substrate in the deepest parts of marshes, ponds, and, occasionally, vernal pools. Some individuals overwinter under hummocks in red maple or highbush blueberry swamps. Upon emergence from overwintering, Blanding's Turtles often leave permanent wetlands and move overland to vernal pools and scrub-shrub swamps, where they feed and mate. It is during the summer months that females estivate in upland forest or along forest/field edges. At night and during periods of hot weather, Blanding's Turtles retreat to "forms." These small terrestrial shelters are found beneath leaf litter, in the grass, or under logs or brush, located up to 110 m (361 ft) from the nearest wetland. They are called "forms" because when the turtle leaves them, they retain the shape of the turtle's shell.

Blanding's Turtles are omnivores, eating both plants and animals. They eat while on land and in the water. The animals Blanding's Turtles are known to eat, either alive or as carrion, consist of pulmonate snails, crayfish, earthworms, insects, golden shiners, brown bullheads, and other small vertebrates. Vernal pools are an important source of many of these prey items. The plants that Blanding's Turtles have been known to eat include coontail, duckweed, bulrush, and sedge.

Courtship and mating takes place during the spring and early summer and typically occurs in water. Baker and Gillingham (1983) reported that in semi-natural conditions male Blanding's Turtles exhibit a variety of behaviors during mating including: chasing, mounting, chinning, gulping, swaying, violent swaying, and snorkeling. Chinning occurs after the male is mounted; if the female moves forward, the male will start gulping (taking in water and expelling it over the female's head). Gulping is typically followed by swaying and escalates to violent swaying if the female remains motionless.

Females will remain in wetland or vernal pool habitat until they begin nesting. The majority of nesting occurs in June in open areas with well-drained loamy or sandy soils, such as dirt roads, powerline right-of-ways, residential lawns, gravel pits, and early successional fields. Female Blanding's Turtles reach sexual maturity at 14-20 years of age (Congdon et al. 1993; Congdon

and van Loben Sels, 1993) and may travel great distances, often more than 1 km (3280 ft), to find appropriate nesting habitat (Grgurovic and Sievert, 2005). Females typically begin nesting during the daylight and continue the process until after dark.

Blanding's Turtles display temperature-dependent sex determination; eggs incubated below a pivotal temperature that lies between 26.5°C and 30°C (79.7-86°F) produce males, and higher temperatures produce females (Ewert and Nelson 1991). Typical clutch size ranges from 10 to 12 eggs. Hatchlings emerge in the late August and September. The typical size of a hatchling is about 3.5 cm (1.4 in.) and 10 g (0.35 oz).

**THREATS:** Blanding's Turtles are particularly vulnerable because they travel very long distances during their active season, do not reproduce until late in life (14-20 yrs), and have low nest and juvenile survivorship. These traits make them extremely sensitive to even a 1-2% increase in adult mortality. Roads are the primary cause of adult mortality. Blanding's Turtles travel to multiple wetlands throughout a single year (typically 3-6 wetlands) and adult females travel to nesting habitats, crossing roads in the process.

As this turtle is relatively difficult to study, it is not known how great a decline this species has experienced. In Massachusetts, few nesting sites are currently known and a variety of factors are attributed to this species' low numbers. Habitat loss, degradation, and fragmentation (i.e., roads) are driven by human activities such as commercial and residential expansion. Other threats include illegal collection, unnaturally inflated rates of predation in suburban and urban areas, agricultural and forestry practices, and natural succession (i.e., loss of open nesting habitat).

#### **MANAGEMENT RECOMMENDATIONS:**

Blanding's Turtle habitat needs to be assessed and prioritized for protection based on the extent, quality, and juxtaposition of habitats and their predicted ability to support self-sustaining populations of Blanding's Turtles, using a turtle habitat model developed by UMass and NHESP records. Other considerations should include the size and lack of fragmentation of both wetland and upland habitats, and proximity and connectivity to other relatively unfragmented habitats, especially within existing protected open space.

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Given limited conservation funds, alternatives to outright purchase of conservation land are an important component to the conservation strategy. These can include Conservation Restrictions (CRs) and Agricultural Preservation Restrictions (APRs). However, these incur long-term monitoring costs. Another method of protecting large blocks of land is through the regulatory process by allowing the building of small or clustered roadside developments in conjunction with the protection of large areas of unimpacted land.

Habitat management and restoration guidelines should be developed and implemented in order to create and/or maintain consistent access to nesting habitat at key sites. This is most practical on state-owned conservation lands (i.e., DFW, DCR). However, educational materials should be made available to guide private land owners on appropriate management practices for Blanding's Turtle habitat.

Alternative wildlife corridor structures should be considered at strategic sites on existing roads. In particular, appropriate wildlife corridor structures should be considered for bridge and culvert upgrades and road-widening projects within Blanding's Turtle Habitat. Efforts should be made to inform Mass Highways of key locations where these measures would be most effective for turtle conservation.

Educational materials are being developed and distributed to the public in reference to the detrimental effects of keeping our native turtles as pets (an illegal activity that reduces reproduction in the population), releasing pet store turtles (which could spread disease), leaving cats and dogs outdoors unattended (particularly during the nesting season), feeding suburban wildlife (which increases numbers of natural predators to turtles), and driving ATVs in nesting areas from June-October. People should be encouraged, when safe to do so, to help Blanding's Turtles cross roads (always in the direction the animal was heading); however, turtles should never be transported to "better" locations. They will naturally want to return to their original location and likely need to traverse roads to do so.

Increased law enforcement is needed to protect our wild populations, particularly during the nesting season when poaching is most frequent and ATV use is common and most damaging.

Forestry Conservation Management Practice guidelines should be applied on state and private lands to avoid direct turtle mortality. Seasonal timber harvesting restrictions apply to Blanding's Turtle habitat and to stands with wetlands. Motorized vehicle access to timber harvesting sites in Blanding's Turtle habitat is restricted to times when the Blanding's Turtle is overwintering. Hand felling in wetland areas is required in order to maintain structural integrity of overwintering sites.

Finally, a statewide monitoring program is needed to track long-term population trends in Blanding's Turtles.

#### ACTIVE PERIOD

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

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*Massachusetts Division of Fisheries & Wildlife*

**Wood Turtle  
*Glyptemys insculpta***

State Status: **Special Concern**

Federal Status: **None**

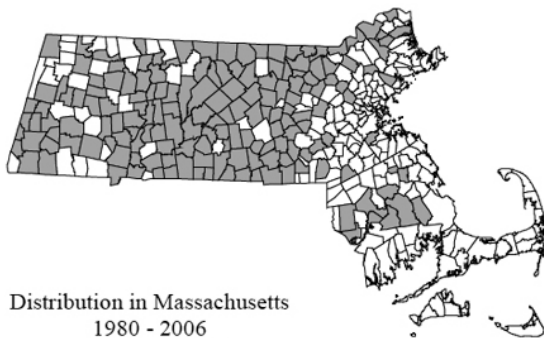
**DESCRIPTION:** The Wood Turtle is a medium-sized turtle (14-20 cm; 5.5-8 in) that can be recognized by its sculpted shell and orange coloration on the legs and neck. The carapace (upper shell) is rough and each scale (scute) rises upwards in an irregularly shaped pyramid of grooves and ridges. The carapace is tan, grayish-brown or brown, has a mid-line ridge (keel) and often has a pattern of black or yellow lines on the larger scutes. The plastron (lower shell) is yellow with oblong dark patches on the outer, posterior corner of each scute. The head is black, but may be speckled with faint yellow spots. The legs, neck, and chin can have orange to reddish coloration. Males have a concave plastron, thick tail, long front claws, and a wider and more robust head than females. Hatchlings have a dull-colored shell that is broad and low and a tail that is almost as long as their carapace, and they lack orange coloration on the neck and legs.



Photo by Mike Jones

**SIMILAR SPECIES:** The habitat of the Eastern Box Turtle (*Terrapene carolina*) and the Blanding's Turtle (*Emydoidea blandingii*) may overlap that of the Wood Turtle, but neither has the Wood Turtle's pyramidal shell segments. Unlike the Wood Turtle, the Box and Blanding's turtles have hinged plastrons into which they can withdraw or partially withdraw if threatened. The Northern Diamond-backed Terrapin (*Malaclemys terrapin*) has a shell similar to that of the Wood Turtle. However, its skin is grey and it lives only near brackish water, which the Wood Turtle avoids.

**RANGE:** The Wood Turtle can be found throughout New England, north to Nova Scotia, west to eastern Minnesota, and south to northern Virginia. The Wood Turtle appears to be widespread in Massachusetts. However, it should be kept in mind that little is known about the status of local populations associated with the majority of these sightings. Most of the towns have fewer than 5 known occurrences.



Distribution in Massachusetts  
1980 - 2006

Based on records in  
Natural Heritage Database

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**HABITAT IN MASSACHUSETTS:** The preferred habitat of the Wood Turtle is riparian areas. Slower moving mid-sized streams are favored, with sandy bottoms and heavily vegetated stream banks. The stream bottom and muddy banks provide hibernating sites for overwintering, and open areas with sand or gravel substrate near the streams edge are used for nesting. Wood Turtles spend most of the spring and summer in mixed or deciduous forests, fields, hay fields, and riparian wetlands, including wet meadows, bogs, and beaver ponds. Then they return to the streams in late summer or early fall to their favored overwintering location.

**LIFE CYCLE & BEHAVIOR:** The Wood Turtle typically spends the winter in flowing rivers and perennial streams. Full-time submersion in the water begins in November, once freezing occurs regularly overnight, and continues until temperatures begin to increase in spring. It may hibernate alone or in large groups in community burrows in muddy banks, stream bottoms, deep pools, instream woody debris, and abandoned muskrat burrows. The Wood Turtle may make underwater movements in the stream during the winter; however, extended periods of activity and emergence from the water do not occur until mid-March or early April.

In spring, Wood Turtles are active during the day and are usually encountered within a few hundred meters from the stream banks. They have relatively linear home ranges that can be a half mile in length in Massachusetts (M. Jones, unpubl data). They will use emergent logs or grassy, sandy, and muddy banks to soak up the spring sun. During the summer months they feed in early successional fields, hayfields, and forests.

Wood Turtles are opportunistic omnivores; their diet consists of both plant and animal matter that is consumed on land and in the water. The Wood Turtle occasionally exhibits an unusual feeding behavior referred to as “stomping.” In its search for food, this species will stomp on the ground alternating its front feet, creating vibrations in the ground resembling rainfall. Earthworms respond, rising to the ground’s surface to keep from drowning. Instead of rain, the earthworm is met by the Wood Turtle, and is promptly devoured.

Although the peaks in mating activity occur in the spring and fall, Wood Turtles are known to mate opportunistically throughout their activity period. Males have been observed exhibiting aggressive behavior such as chasing, biting, and butting both during the mating season and at other times. A courtship ritual “dance” typically takes place at the edge of a stream or brook for several hours prior to mating. The dance involves the male and female approaching each other slowly with necks extended and their heads up. Before they actually touch noses, they lower their heads, and swing them from side to side. Copulation usually takes place in the water. Courting adults may produce a very subdued whistle that is rarely heard by observers. A female may mate with multiple individuals over the course of the active season.

In Massachusetts, most nesting occurs over a four-week period, primarily in June. Nesting sites may be a limited resource for Wood Turtles. Females are known to travel long distances in search of appropriate nesting habitat (average straight line distance of 244 m/800 ft). Once they have arrived at a suitable nesting area, there may be multiple nesting attempts or false nests that occur over the course of several days, prior to laying eggs. They abort attempts when disturbed (e.g., by human activities) early in the process or they hit a large rock while digging. Female Wood Turtles lay one clutch a year and often congregate in a good nesting area. Clutch size in Massachusetts averages 7 eggs (Jones, 2004, pers. comm.). Hatchling emergence occurs from August through September. The life span of the adult Wood Turtle is easily 46 years and may reach as much as 100 years.

**THREATS:** Hatchling and juvenile survival is very low and the time to sexual maturity is long. These characteristics are compensated by adults living a long time and reproducing for many years. Adult survivorship must be very high to sustain a viable population. These characteristics make Wood Turtles vulnerable to human disturbances. Population declines of Wood Turtles have likely been caused by hay-mowing operations, development of wooded stream banks, roadway casualties, incidental collection of specimens for pets, unnaturally inflated rates of predation in suburban and urban areas, forestry and agricultural activities, and pollution of streams.

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**MANAGEMENT RECOMMENDATIONS:** Using a turtle habitat model developed by UMass and NHESP records, Wood Turtle habitat needs to be assessed and prioritized for protection based on the extent, quality, and juxtaposition of habitats and their predicted ability to support self-sustaining populations of Wood Turtles. Other considerations should include the size and lack of fragmentation of both riverine and upland habitats and proximity and connectivity to other relatively unfragmented habitats, especially within existing protected open space. This information will be used to direct land acquisition and to target areas for Conservation Restrictions (CRs), Agricultural Preservation Restrictions (APRs), and Landowner Incentive Program (LIP) projects.

Mowing and nest site creation guidelines developed by NHESP should be followed on properties managed for Wood Turtles. These practices will be most practical on state-owned conservation lands. However, these materials are also available to town land managers and private landowners.

Alternative wildlife corridor structures should be considered at strategic sites on existing roads. In particular, appropriate wildlife corridor structures should be considered for bridge and culvert upgrades and road-widening projects within or near Wood Turtle habitat. Efforts should be made to inform local regulatory agencies of key locations where these measures would be most effective for Wood Turtle conservation.

Educational materials are being developed and distributed to the public in reference to the detrimental effects of keeping our native Wood Turtles as pets (an illegal activity that reduces reproduction in the population), releasing pet store turtles (which could spread disease), leaving cats and dogs outdoors unattended (particularly during the nesting season), mowing of fields and shrubby areas, feeding suburban wildlife (which increases the number of natural predators on turtles), and driving ATVs in nesting areas from June-October. People should be encouraged, when safe to do so, to help Wood Turtles cross roads (always in the direction the animal was heading); however, turtles should never be transported to “better” locations. They will naturally want to return to their original location and likely need to traverse roads to do so.

Increased law enforcement is needed to protect our wild turtles, particularly during the nesting season when poaching is most frequent and ATV use is common and most damaging.

Forestry Conservation Management Practices should be applied on state and private lands to avoid direct turtle mortality. Seasonal timber harvesting restrictions apply to Wood Turtle habitat and to upland habitat that occurs up to 600 ft (183 m) beyond the stream edge. Motorized vehicle access to timber harvesting sites in Wood Turtle habitat is restricted to times when the Wood Turtle is overwintering. Bridges should be laid down across streams prior to any motorized equipment crossing the stream in order to maintain the structural integrity of overwintering sites.

Finally, a statewide monitoring program is needed to track long-term population trends in Wood Turtles.

#### ACTIVE PERIOD

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

#### REFERENCES:

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- DeGraaf, R.M., and D.D. Rudis. 1983. *Amphibians and Reptiles of New England*. Amherst, Massachusetts: The University of Massachusetts.
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*Massachusetts Division of Fisheries & Wildlife*

**Eastern Box Turtle  
*Terrapene carolina***

State Status: **Special Concern**  
Federal Status: **None**

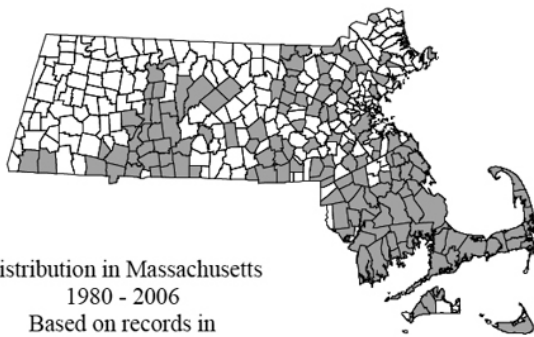
**DESCRIPTION:** The Eastern Box Turtle is a small terrestrial turtle ranging from 11.4–16.5 cm (4.5–6.6 in.) in length. It is so named because a hinge on the lower shell (plastron) allows it to enclose head, legs, and tail completely within the upper (carapace) and lower shells. The adult box turtle has an oval, high-domed shell with variable coloration and markings. The carapace is usually dark brown or black with numerous irregular yellow, orange, or reddish blotches. The plastron typically has a light and dark variable pattern, but some may be completely tan, brown, or black. The head, neck, and legs also vary in color and markings, but are generally dark with orange or yellow mottling. The Eastern Box Turtle has a short tail and an upper jaw ending in a down-turned beak. The male box turtle almost always has red eyes, and females have yellowish-brown or sometimes dark red eyes. Males have a moderately concave plastron (females' are flat), the claws on the hind legs are longer, and the tail is both longer and thicker than the females. Hatchlings have a brownish-gray carapace with a yellow spot on each scute (scale or plate), and a distinct light-colored mid-dorsal keel (ridge). The plastron is yellow with a black central blotch, and the hinge is poorly developed.



*Photo by Liz Willey*

**SIMILAR SPECIES:** The Blanding's Turtle (*Emydoidea blandingii*) may be confused with the Eastern Box Turtle. Often referred to as the "semi-box turtle," the Blanding's Turtle has a hinged plastron enabling the turtle to pull into its shell, but with less closure than in the Eastern Box Turtle. Both may have yellow markings on the carapace; however, the markings on a Blanding's Turtle are spots or flecks rather than blotches. An adult Blanding's Turtle is larger than the box turtle (15-23 cm; 6-9 in. in shell length). While both will be found nesting in similar habitat, the Blanding's Turtle is essentially aquatic whereas the Eastern Box Turtle is terrestrial. Eastern Box Turtle hatchlings could be confused with Spotted Turtle hatchlings, because both have spots on each scute. However, the Spotted Turtle lacks a mid-dorsal keel.

**RANGE:** The range of the Eastern Box Turtle is from southeastern Maine; south to northern Florida; and west to Michigan, Illinois, and Tennessee. Although Eastern Box Turtles occur in many towns in Massachusetts, they are more heavily concentrated in the southeastern section of the state.



Distribution in Massachusetts  
1980 - 2006  
Based on records in  
Natural Heritage Database

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**HABITAT IN MASSACHUSETTS:** The Eastern Box Turtle is a terrestrial turtle, inhabiting many types of habitats. It is found in both dry and moist woodlands, brushy fields, thickets, marsh edges, bogs, swales, fens, stream banks, and well-drained bottomland.

**LIFE CYCLE & BEHAVIOR:** The Eastern Box Turtle hibernates in the northern parts of its range from late October or November until mid-March or April depending on the weather. Box turtles overwinter in upland forest, a few inches under the soil surface, typically covered by leaf litter or woody debris. As soil temperatures drop, the turtles burrow into soft ground. Overwintering is usually not communal, although several may overwinter within close proximity of one another. Some individuals may emerge prematurely during warm spells in winter and early spring. When this occurs, they may perish from exposure if there is a sudden cold snap. During the spring, Box Turtles start to forage and mate in the forest and fields.

In summer, adult Box Turtles are most active in the morning and evening, particularly after a rainfall. To avoid the heat of the day, they often seek shelter under rotting logs or masses of decaying leaves, in mammal burrows, or in mud. They often scoop out a “form” (a small domelike space) in leaf litter, grasses, ferns, or mosses where they spend the night. These forms may be used on more than one occasion over a period of weeks. Though known as “land turtles”, in the hottest weather they frequently enter shaded shallow pools and puddles and remain there for periods varying from a few hours to a few days. In the cooler temperatures of spring and fall, box turtles forage at any daylight hour.

The Eastern Box Turtle is omnivorous, feeding on animal matter such as slugs, insects, earthworms, snails, and even carrion. Box Turtles also have a fondness for mushrooms, berries, fruits, leafy vegetables, roots, leaves, and seeds.

Females reach sexual maturity at approximately 13 years of age. Mating is opportunistic and may take place anytime between April and October. Courtship begins with the male circling, biting, and shoving the female. Afterward, the premounting and copulatory phases take place. Females can store sperm and lay fertile eggs up to four years after mating.

Females nest in June or early July and can travel great distances to find appropriate nesting habitat. They may travel up to approximately 1600 m (1 mile), many of them crossing roads during their journey. Nesting areas may be in early successional fields, meadows, utility right of ways, woodland openings, roadsides, cultivated gardens, residential lawns, mulch piles, beach dunes, and abandoned gravel pits. Females sometimes exhibit nest site fidelity, laying eggs in close proximity to the previous years’ nest. Females typically start nesting in the late afternoon or early evening and continue for up to five hours.

**THREATS:** There are several reasons the Eastern Box Turtle is under threat in Massachusetts: habitat destruction resulting from residential and industrial development; road mortality; collection by individuals for pets; mowing of fields and early successional habitat during the active season; unnaturally inflated rates of predation in suburban and urban areas; disturbance of nest sites by ATVs; and genetic degradation due to the release of non-native (pet store) turtles. The release of non-native species could also transmit disease, which may become an issue in Massachusetts, but is not currently a problem.

**MANAGEMENT RECOMMENDATIONS:** Using NHESP records, Eastern Box Turtle habitat needs to be assessed and prioritized for protection based on the extent, quality, and juxtaposition of habitats and their predicted ability to support self-sustaining populations of box turtles. Other considerations should include the size and lack of fragmentation of habitat and proximity and connectivity to other relatively unfragmented habitats, especially within existing protected open space.

Given limited conservation funds, alternatives to outright purchase of conservation land is an important component to the conservation strategy. These can include Conservation Restrictions (CRs) and Agricultural Preservation Restrictions (APRs).

Habitat management and restoration guidelines should be developed and implemented in order to create and/or maintain consistent access to nesting habitat at key sites. This is most practical on state-owned conservation lands (i.e. DFW, DCR). However, educational materials should be made available to guide private landowners on the best management practices for box turtle habitat.

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Alternative wildlife corridor structures should be considered at strategic sites on existing roads. In particular, appropriate wildlife corridor structures should be considered for bridge and culvert upgrades and road-widening projects within box turtle habitat. Efforts should be made to inform local regulatory agencies of key locations where these measures would be most effective for turtle conservation.

Educational materials need to be developed and distributed to the public in reference to the detrimental effects of keeping our native box turtles as pets (an illegal activity that slows reproduction in the population), releasing pet store turtles (which could spread disease), leaving cats and dogs outdoors unattended (particularly during the nesting season), mowing of fields and shrubby areas, feeding suburban wildlife (which increases numbers of natural predators on turtles), and driving ATVs in nesting areas from June to October. People should be encouraged, when safe to do so, to help box turtles cross roads (always in the direction the animal was heading); however, turtles should never be transported to “better” locations. They will naturally want to return to their original location and likely need to traverse roads to do so.

Increased law enforcement is needed to protect our wild populations, particularly during the nesting season when poaching is most frequent and ATV use is common and most damaging.

Forestry Conservation Management Practices should be applied on state and private lands to avoid direct turtle mortality. Motorized vehicle access to timber harvesting sites in box turtle habitat should be restricted to the times when box turtles are inactive during the winter, preferably when the ground is frozen. Motorized vehicles should not be used for soil scarification.

Finally, a statewide monitoring program is needed to track long-term population trends in Eastern Box Turtles.

### Active Period

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec

### REFERENCES:

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# BioMap2

CONSERVING THE BIODIVERSITY OF  
MASSACHUSETTS IN A CHANGING WORLD

## Carlisle

Produced in 2012

This report and associated map provide information about  
important sites for biodiversity conservation in your area.

**This information is intended for conservation planning, and is  
not intended for use in state regulations.**





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## Introduction

The Massachusetts Department of Fish & Game, through the Division of Fisheries and Wildlife's Natural Heritage & Endangered Species Program (NHESP), and The Nature Conservancy's Massachusetts Program developed *BioMap2* to protect the state's biodiversity in the context of climate change.

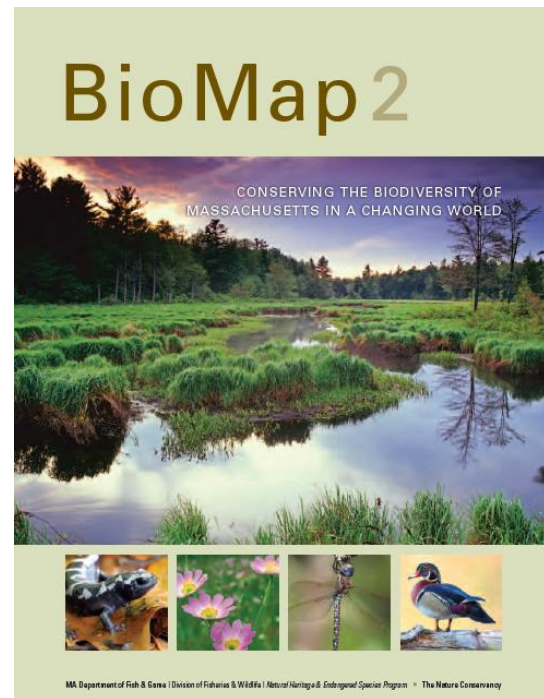
*BioMap2* combines NHESP's 30 years of rigorously documented rare species and natural community data with spatial data identifying wildlife species and habitats that were the focus of the Division of Fisheries and Wildlife's 2005 State Wildlife Action Plan (SWAP). *BioMap2* also integrates The Nature Conservancy's assessment of large, well-connected, and intact ecosystems and landscapes across the Commonwealth, incorporating concepts of ecosystem resilience to address anticipated climate change impacts.

Protection and stewardship of *BioMap2* Core Habitat and Critical Natural Landscape is essential to safeguard the diversity of species and their habitats, intact ecosystems, and resilient natural landscapes across Massachusetts.

## What Does Status Mean?

The Division of Fisheries and Wildlife determines a status category for each rare species listed under the Massachusetts Endangered Species Act, M.G.L. c.131A, and its implementing regulations 321 CMR 10.00. Rare species are categorized as Endangered, Threatened or of Special Concern according to the following:

- Endangered species are in danger of extinction throughout all or a significant portion of their range or are in danger of extirpation from Massachusetts.



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- Threatened species are likely to become Endangered in Massachusetts in the foreseeable future throughout all or a significant portion of their range.
- Special Concern species have suffered a decline that could threaten the species if allowed to continue unchecked or occur in such small numbers or with such restricted distribution or specialized habitat requirements that they could easily become Threatened in Massachusetts.

In addition NHESP maintains an unofficial watch list of plants that are tracked due to potential conservation interest or concern, but are not regulated under the Massachusetts Endangered Species Act or other laws or regulations. Likewise, described natural communities are not regulated by any law or regulations, but they can help to identify



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**Massachusetts Division of Fisheries and Wildlife**  
1 Rabbit Hill Road, Westborough, MA 01581  
phone: 508-389-6360 fax: 508-389-7890



ecologically important areas that are worthy of protection. The status of natural communities reflects the documented number and acreages of each community type in the state:

- Critically Imperiled communities typically have 5 or fewer documented sites or have very few remaining acres in the state.
- Imperiled communities typically have 6-20 sites or few remaining acres in the state.
- Vulnerable communities typically have 21-100 sites or limited acreage across the state.
- Secure communities typically have over 100 sites or abundant acreage across the state; however, excellent examples are identified as Core Habitats to ensure continued protection.

In 2005 the Massachusetts Division of Fisheries and Wildlife completed a comprehensive State Wildlife Action Plan (SWAP) documenting the status of Massachusetts wildlife and providing recommendations to help guide wildlife conservation decision-making. SWAP includes all the wildlife species listed under the Massachusetts Endangered Species Act (MESA), as well as more than 80 species that need conservation attention but do not meet the requirements for inclusion under MESA. The SWAP document is organized around habitat types in need of conservation within the Commonwealth. While the original BioMap focused primarily on rare species protected under MESA, *BioMap2* also addresses other Species of Conservation Concern, their habitats, and the ecosystems that support them to create a spatial representation of most of the elements of SWAP.

### ***BioMap2: One Plan, Two Components***

*BioMap2* identifies two complementary spatial layers, Core Habitat and Critical Natural Landscape.

Core Habitat identifies key areas that are critical for the long-term persistence of rare species and other Species of Conservation Concern, as well as a wide diversity of natural communities and intact ecosystems across the Commonwealth. Protection of Core Habitats will contribute to the conservation of specific elements of biodiversity.

Critical Natural Landscape identifies large natural Landscape Blocks that are minimally impacted by development. If protected, these areas will provide habitat for wide-ranging native species, support intact ecological processes, maintain connectivity among habitats, and enhance ecological resilience to natural and anthropogenic disturbances in a rapidly changing world. Areas delineated as Critical Natural Landscape also include buffering upland around wetland, coastal, and aquatic Core Habitats to help ensure their long-term integrity.

The long-term persistence of Massachusetts biological resources requires a determined commitment to land and water conservation. Protection and stewardship of both Critical Natural Landscapes and Core Habitats are needed to realize the biodiversity conservation vision of *BioMap2*.

### **Components of Core Habitat**

Core Habitat identifies specific areas necessary to promote the long-term persistence of rare species, other Species of Conservation Concern, exemplary natural communities, and intact ecosystems.

### **Rare Species**

There are 432 native plant and animal species listed as Endangered, Threatened or Special Concern under the Massachusetts Endangered Species Act (MESA) based on their rarity, population trends, and threats to survival. For





Table 1. Species of Conservation Concern described in the State Wildlife Action Plan and/or included on the MESA List and for which habitat was mapped in *BioMap2*. Note that plants are not included in SWAP, and that marine species such as whales and sea turtles are not included in *BioMap2*.

Taxonomic Group	MESA-listed Species	Non-listed Species of Conservation Concern
Mammals	4	5
Birds	27	23
Reptiles	10	5
Amphibians	4	3
Fish	10	17
Invertebrates	102	9
Plants	256	0
<b>Total</b>	<b>413</b>	<b>62</b>

*BioMap2*, NHESP staff identified the highest quality habitat sites for each non-marine species based on size, condition, and landscape context.

### Other Species of Conservation Concern

In addition to species on the MESA List described previously, the State Wildlife Action Plan (SWAP) identifies 257 wildlife species and 22 natural habitats most in need of conservation within the Commonwealth. *BioMap2* includes species-specific habitat areas for 45 of these species and habitat for 17 additional species which was mapped with other coarse-filter and fine-filter approaches.

### Priority Natural Communities

Natural communities are assemblages of plant and animal species that share a common environment and occur together repeatedly on the landscape. *BioMap2* gives conservation

priority to natural communities with limited distribution and to the best examples of more common types.

### Vernal Pools

Vernal pools are small, seasonal wetlands that provide important wildlife habitat, especially for amphibians and invertebrate animals that use them to breed. *BioMap2* identifies the top 5 percent most interconnected clusters of Potential Vernal Pools in the state.

### Forest Cores

In *BioMap2*, Core Habitat includes the best examples of large, intact forests that are least impacted by roads and development, providing critical habitat for numerous woodland species. For example, the interior forest habitat defined by Forest Cores supports many bird species sensitive to the impacts of roads and development, such as the Black-throated Green Warbler, and helps maintain ecological processes found only in unfragmented forest patches.

### Wetland Cores

*BioMap2* used an assessment of Ecological Integrity to identify the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

### Aquatic Cores

To delineate integrated and functional ecosystems for fish species and other aquatic







Species of Conservation Concern, beyond the species and exemplary habitats described above, *BioMap2* identifies intact river corridors within which important physical and ecological processes of the river or stream occur.

### Components of Critical Natural Landscape

Critical Natural Landscape identifies intact landscapes in Massachusetts that are better able to support ecological processes and disturbance regimes, and a wide array of species and habitats over long time frames.

### Landscape Blocks

*BioMap2* identifies the most intact large areas of predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes.

### Upland Buffers of Wetland and Aquatic Cores

A variety of analyses were used to identify protective upland buffers around wetlands and rivers.

### Upland Habitat to Support Coastal Adaptation

*BioMap2* identifies undeveloped lands adjacent to and up to one and a half meters above existing salt marshes as Critical Natural Landscapes with high potential to support inland migration of salt marsh and other coastal habitats over the coming century.

The conservation areas identified by *BioMap2* are based on breadth and depth of data, scientific expertise, and understanding of Massachusetts' biodiversity. The numerous sources of information and analyses used to

### Legal Protection of Biodiversity

*BioMap2* presents a powerful vision of what Massachusetts would look like with full protection of the land most important for supporting the Commonwealth's biodiversity. While *BioMap2* is a planning tool with *no regulatory function*, all state-listed species enjoy legal protection under the [Massachusetts Endangered Species Act](#) (M.G.L. c.131A) and its implementing regulations ([321 CMR 10.00](#)). Wetland habitat of state-listed wildlife is also protected under the [Wetlands Protection Act](#) Regulations ([310 CMR 10.00](#)). The *Natural Heritage Atlas* contains maps of [Priority Habitats](#) and [Estimated Habitats](#), which are used, respectively, for regulation under the Massachusetts Endangered Species Act and the Wetlands Protection Act. For more information on rare species regulations, and to view Priority and Estimated Habitat maps, please see the [Regulatory Review](#) page at <http://www.mass.gov/eea/agencies/dfg/dfw/natural-heritage/regulatory-review/>.

***BioMap2 is a conservation planning tool that does not, in any way, supplant the Estimated and Priority Habitat Maps which have regulatory significance. Unless and until the BioMap2 vision is fully realized, we must continue to protect our most imperiled species and their habitats.***

create Core Habitat and Critical Natural Landscape are complementary, and outline a comprehensive conservation vision for Massachusetts, from rare species to intact landscapes. In total, these robust analyses define a suite of priority lands and waters that, if permanently protected, will support Massachusetts' natural systems for generations to come.





## Understanding Core Habitat Summaries

Following the Town Overview, there is a descriptive summary of each Core Habitat and Critical Natural Landscape that occurs in your city or town. These summaries highlight some of the outstanding characteristics of each Core Habitat and Critical Natural Landscape, and will help you learn more about your city or town's biodiversity. You can find out more information about many of these species and natural communities by looking at specific fact sheets at [www.mass.gov/nhesp](http://www.mass.gov/nhesp).

## Additional Information

For copies of the full *BioMap2* report, the Technical Report, and an [interactive mapping tool](#), visit the *BioMap2* [website](#) via the Land Protection and Planning tab at [www.mass.gov/nhesp](http://www.mass.gov/nhesp). If you have any questions about this report, or if you need help protecting land for biodiversity in your community, the Natural Heritage & Endangered Species Program staff looks forward to working with you.

Contact the Natural Heritage & Endangered Species Program

By phone 508-389-6360  
By fax 508-389-7890  
By email [natural.heritage@state.ma.us](mailto:natural.heritage@state.ma.us)  
By Mail 100 Hartwell Street, Suite 230  
West Boylston, MA 01583

The GIS datalayers of *BioMap2* are available for download from MassGIS at [www.mass.gov/mgis](http://www.mass.gov/mgis).



**Natural Heritage  
& Endangered  
Species Program**

**Massachusetts Division of Fisheries and Wildlife**  
1 Rabbit Hill Road, Westborough, MA 01581  
phone: 508-389-6360 fax: 508-389-7890

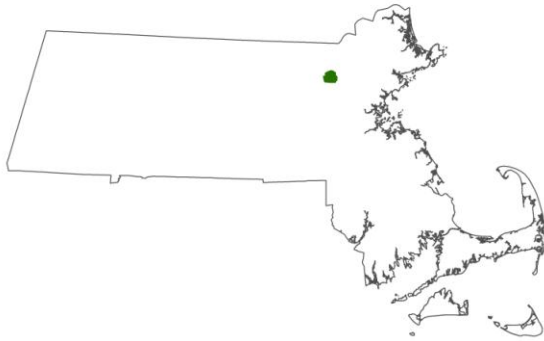
For more information on rare species and natural communities, please see our fact sheets online at [www.mass.gov/nhesp](http://www.mass.gov/nhesp).





## Town Overview

Carlisle lies within the Southern New England Coastal Plains and Hills Ecoregion, an area comprised of plains with a few low hills. Forests are mainly central hardwoods with some transition hardwoods and some elm-ash-red maple and red and white pine. Many major rivers drain this area.



## Carlisle at a Glance

- Total Area: 9,935 acres (15.5 square miles)
- Human Population in 2010: 4,852
- Open space protected in perpetuity: 3,160 acres, or 31.8% percent of total area\*
- BioMap2 Core Habitat: 3,171 acres
- BioMap2 Core Habitat Protected: 1,558 acres or 49.1%
- BioMap2 Critical Natural Landscape: 913 acres
- BioMap2 Critical Natural Landscape Protected: 621 acres or 68.1%.

## BioMap2 Components

### Core Habitats

- 1 Forest Core
- 3 Wetland Cores
- 1 Aquatic Core
- 6 Species of Conservation Concern Cores\*\*
  - 2 reptiles, 3 amphibians, 2 plants

### Critical Natural Landscape

- 1 Landscape Block
- 1 Wetland Core Buffer
- 2 Aquatic Core Buffers

\* Calculated using MassGIS data layer "Protected and Recreational Open Space—March, 2012".

\*\* See next pages for complete list of species, natural communities and other biodiversity elements.

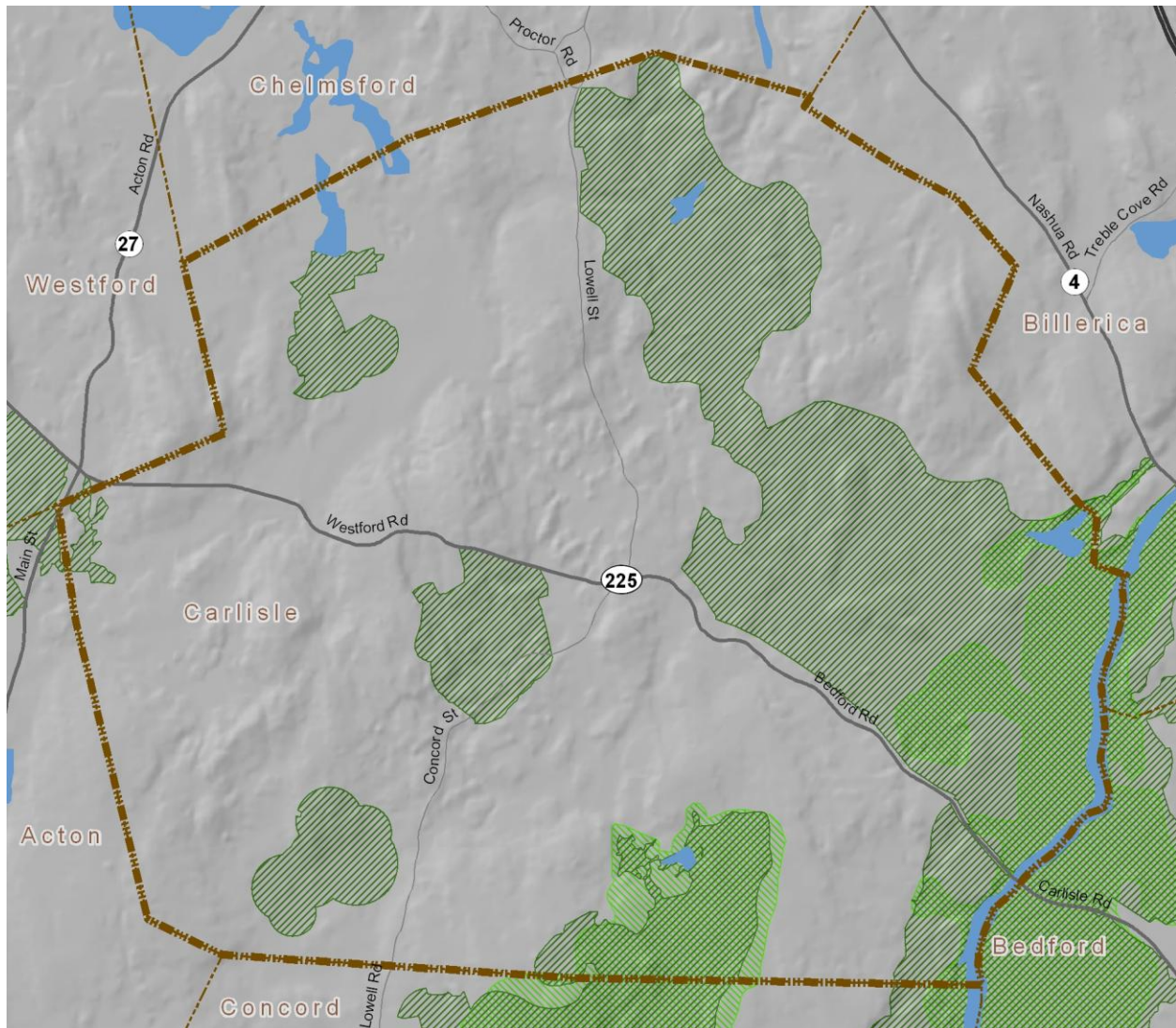




BioMap2

Conserving the Biodiversity of Massachusetts in a Changing World

## BioMap2 Core Habitat and Critical Natural Landscape in Carlisle

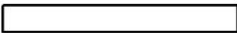


BioMap2 Core Habitat



BioMap2 Critical Natural Landscape

1 Mile



**Natural Heritage  
& Endangered  
Species Program**

**Massachusetts Division of Fisheries and Wildlife**

1 Rabbit Hill Road, Westborough, MA 01581

phone: 508-389-6360 fax: 508-389-7890

For more information on rare species and natural communities, please see our fact sheets online at [www.mass.gov/nhesp](http://www.mass.gov/nhesp).



**Species of Conservation Concern, Priority and Exemplary Natural Communities,  
and Other Elements of Biodiversity in Carlisle**

**Amphibians**

[Four-toed Salamander](#), (*Hemidactylium scutatum*), Non-listed SWAP

Northern Leopard Frog, (*Rana pipiens*), Non-listed SWAP

[Blue-spotted Salamander](#), (*Ambystoma laterale*), SC

**Reptiles**

Eastern Ribbon Snake, (*Thamnophis sauritus*), Non-listed SWAP

[Blanding's Turtle](#), (*Emydoidea blandingii*), T

**Plants**

[Climbing Fern](#), (*Lygodium palmatum*), SC

[Britton's Violet](#), (*Viola brittoniana*), T

**Other BioMap2 Components**

[Forest Core](#)

[Aquatic Core](#)

[Wetland Core](#)

[Landscape Block](#)

[Aquatic Core Buffer](#)

[Wetland Core Buffer](#)

E = Endangered

T = Threatened

SC = Special Concern

S1 = Critically Imperiled communities, typically 5 or fewer documented sites or very few remaining acres in the state.

S2 = Imperiled communities, typically 6-20 sites or few remaining acres in the state.

S3 = Vulnerable communities, typically have 21-100 sites or limited acreage across the state.

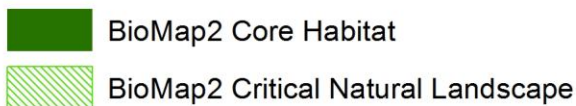
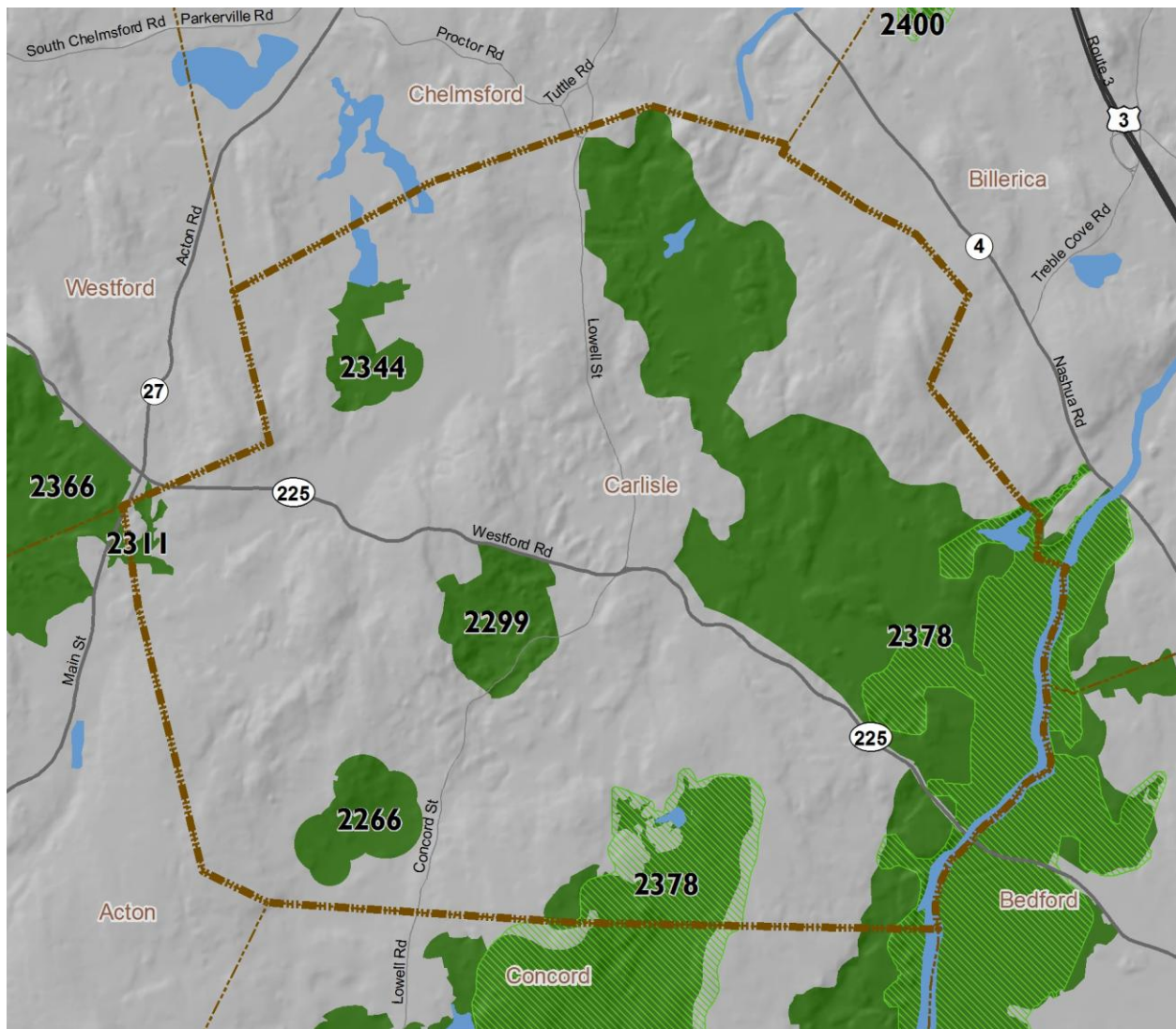




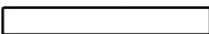


## BioMap2 Core Habitat in Carlisle

Core IDs correspond with the following element lists and summaries.



1 Mile



Natural Heritage  
& Endangered  
Species Program

Massachusetts Division of Fisheries and Wildlife

1 Rabbit Hill Road, Westborough, MA 01581

phone: 508-389-6360 fax: 508-389-7890

For more information on rare species and natural communities, please see our fact sheets online at [www.mass.gov/nhesp](http://www.mass.gov/nhesp).

Elements of BioMap2 Cores

This section lists all elements of BioMap2 Cores that fall *entirely or partially* within Carlisle. The elements listed here may not occur within the bounds of Carlisle.

**Core 2266**

Species of Conservation Concern

Blue-spotted Salamander

*Ambystoma laterale*

SC

**Core 2299**

Species of Conservation Concern

Eastern Ribbon Snake

*Thamnophis sauritus*

Non-listed SWAP

**Core 2311**

Species of Conservation Concern

Climbing Fern

*Lygodium palmatum*

SC

**Core 2344**

Species of Conservation Concern

Blue-spotted Salamander

*Ambystoma laterale*

SC

**Core 2378**

Forest Core

Aquatic Core

Wetland Core

Priority &amp; Exemplary Natural Communities

Small-river floodplain forest

S2

Species of Conservation Concern

Britton's Violet

*Viola brittoniana*

T

Engelmann's Umbrella-sedge

*Cyperus engelmannii*

T

Few-seeded Sedge

*Carex oligosperma*

E

Long's Bulrush

*Scirpus longii*

T

Violet Wood-sorrel

*Oxalis violacea*

E

Creeper

*Strophitus undulatus*

SC

Eastern Pondmussel

*Ligumia nasuta*

SC

Triangle Floater

*Alasmidonta undulata*

Non-listed SWAP

Two-striped Cord Grass Moth

*Macrochilo bivittata*

Non-listed SWAP

Arrow Clubtail

*Stylurus spiniceps*

Non-listed SWAP

Umber Shadowdragon

*Neurocordulia obsoleta*

SC

Blue-spotted Salamander

*Ambystoma laterale*

SC

Four-toed Salamander

*Hemidactylium scutatum*

Non-listed SWAP

Northern Leopard Frog

*Rana pipiens*

Non-listed SWAP





Blanding's Turtle	<i>Emydoidea blandingii</i>	T
Eastern Ribbon Snake	<i>Thamnophis sauritus</i>	Non-listed SWAP
American Bittern	<i>Botaurus lentiginosus</i>	E
Common Moorhen	<i>Gallinula chloropus</i>	SC
King Rail	<i>Rallus elegans</i>	T
Least Bittern	<i>Ixobrychus exilis</i>	E
Pied-billed Grebe	<i>Podilymbus podiceps</i>	E
Sora	<i>Porzana carolina</i>	Non-listed SWAP





## Core Habitat Summaries

### **Core 2266**

A 176-acre Core Habitat featuring a Species of Conservation Concern.

Adult and juvenile Blue-spotted Salamanders inhabit upland forests during most of the year, where they reside in small-mammal burrows and other subsurface retreats. Adults migrate during late winter or early spring to breed in vernal pools and fish-free areas of swamps, marshes, or similar wetlands. Larvae metamorphose in late summer or early fall, whereupon they disperse into upland forest.

### **Core 2299**

A 219-acre Core Habitat featuring Species of Conservation Concern.

Eastern Ribbon Snakes are a medium-sized, very thin snake ranging from 7 to 34 inches long at maturity. They are active during the day and live in wetlands and edges of open water being comfortable in water and on land, eating amphibians, insects, and occasional fish. This species hibernates in ant mounds, rodent burrows, crayfish burrows, and bank burrows.

### **Core 2311**

A 35-acre Core Habitat featuring a Species of Conservation Concern.

Climbing Fern does not have the characteristic overall shape of most ferns. Instead, it is an evergreen, ivy-like plant which sprawls over the ground or climbs clockwise short distances up shrubs and coarse herbs. Climbing Fern grows in moist pine-oak-maple woods with an open understory, in moist thickets, and along stream margins. This plant prefers acidic soils that are sandy and rich in humus, but nutrient-poor.

### **Core 2344**

A 132-acre Core Habitat featuring a Species of Conservation Concern.

Adult and juvenile Blue-spotted Salamanders inhabit upland forests during most of the year, where they reside in small-mammal burrows and other subsurface retreats. Adults migrate during late winter or early spring to breed in vernal pools and fish-free areas of swamps, marshes, or similar wetlands. Larvae metamorphose in late summer or early fall, whereupon they disperse into upland forest.

### **Core 2378**

An 8,090-acre Core Habitat featuring Forest Core, Wetland Core, Aquatic Core, Priority Natural Communities, and Species of Conservation Concern.

The Assabet and Sudbury Rivers meet in the town of Concord and become the Concord River. Just downstream of this confluence, the Concord opens out into the wide marshes of the Great Meadows National Wildlife Refuge. This complex of rivers, wetlands, and adjacent uplands supports 22 rare and uncommon species of birds, plants, freshwater mussels, and dragonflies, among others. The







impoundments along the Concord in Great Meadows NWR are one of the few sites in southern New England that near-annually support breeding populations of the entire suite of rare and common marsh birds.

Small-River Floodplain Forests are silver maple/green ash forests occurring on alluvial soils of small rivers and streams. They occur on small tributaries of the Connecticut and Nashua Rivers and along some small rivers of eastern Massachusetts. One example of Small-River Floodplain Forest, though small, is relatively undisturbed and is well buffered by surrounding natural vegetation. Another large but narrow example of Small-River Floodplain Forest is in good condition, but its linear shape leaves it more vulnerable to disturbance because of its larger edge area.

Forest Cores are the best examples of large, intact forests that are least impacted by roads and development. Forest Cores support many bird species sensitive to the impacts of roads and development and help maintain ecological processes found only in unfragmented forest patches.

Wetlands Cores are the least disturbed wetlands in the state within undeveloped landscapes—those with intact buffers and little fragmentation or other stressors associated with development. These wetlands are most likely to support critical wetland functions (i.e., natural hydrologic conditions, diverse plant and animal habitats, etc.) and are most likely to maintain these functions into the future.

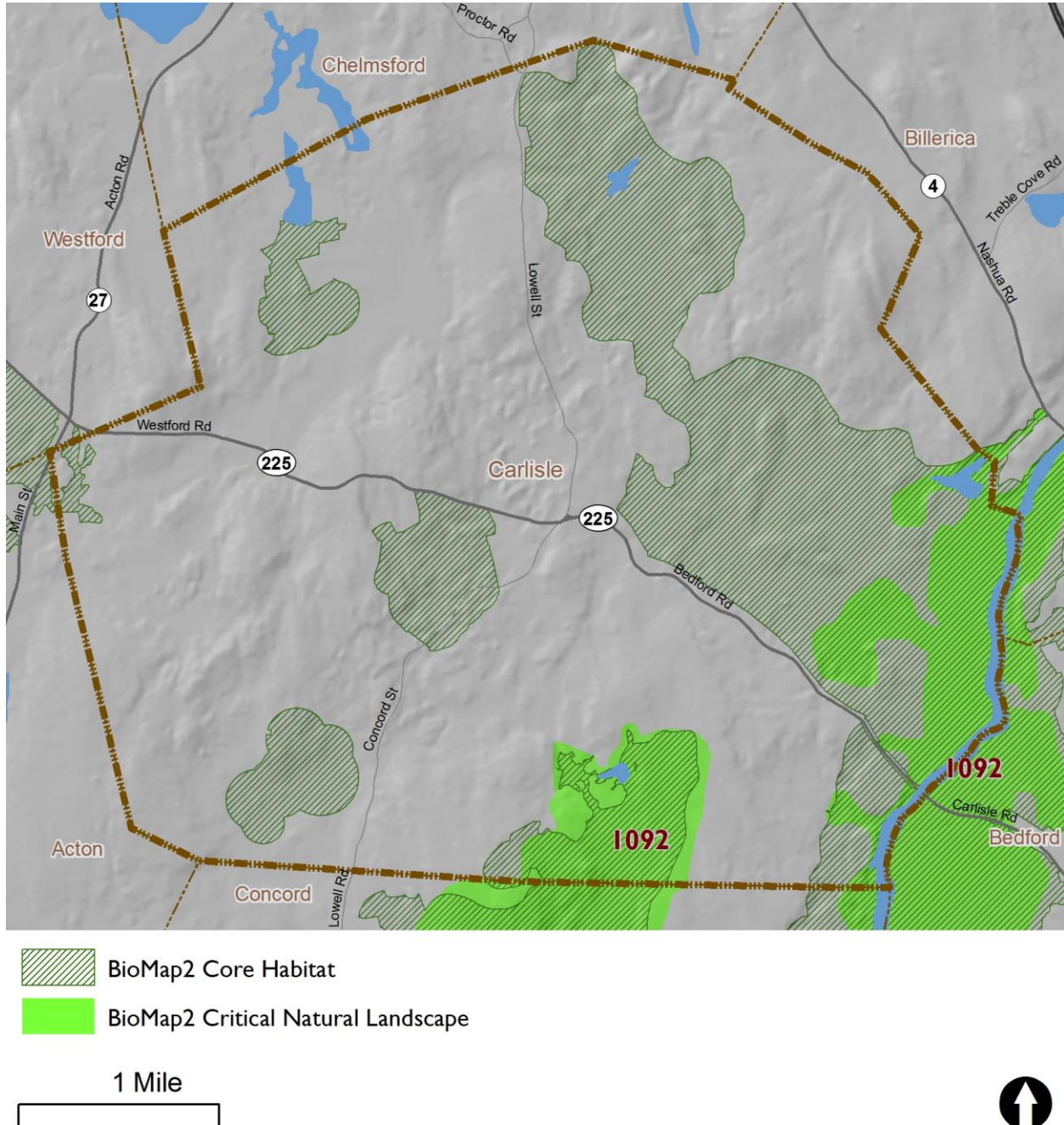
Aquatic Cores are intact river corridors within which important physical and ecological processes of the river or stream occur. They delineate integrated and functional ecosystems for fish species and other aquatic Species of Conservation Concern.





## BioMap2 Critical Natural Landscape in Carlisle

Critical Natural Landscape IDs correspond with the following element lists and summaries.





### Elements of BioMap2 Critical Natural Landscapes

This section lists all elements of BioMap2 Critical Natural Landscapes that fall *entirely or partially* within Carlisle. The elements listed here may not occur within the bounds of Carlisle.

#### **CNL 1092**

Aquatic Core Buffer  
Landscape Block  
Wetland Core Buffer





## Critical Natural Landscape Summaries

### **CNL 1092**

A 4,277-acre Critical Natural Landscape featuring Aquatic Core Buffer, Wetland Core Buffer and Landscape Block.

A variety of analyses were used to identify protective upland buffers around wetlands and rivers. One, the variable width buffers methodology, included the most intact areas around each wetland and river, by extending deeper into surrounding unfragmented habitats than into developed areas adjacent to each wetland. Other upland buffers were identified through the rare species habitat analysis. In this way, the conservation of wetland buffers will support the habitats and functionality of each wetland, and also include adjacent uplands that are important for many species that move between habitat types.

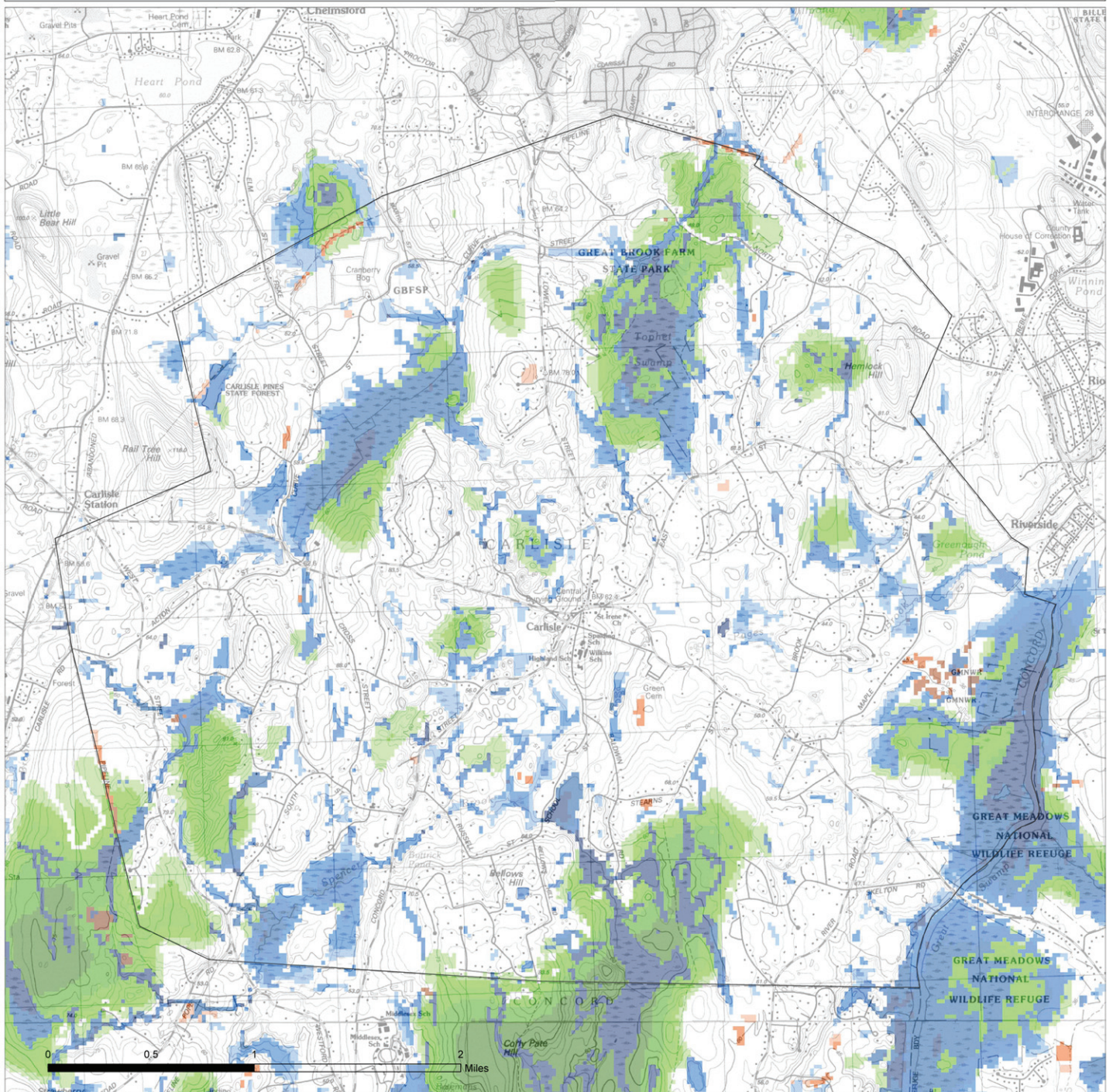
Landscape Blocks, the primary component of Critical Natural Landscapes, are large areas of intact predominately natural vegetation, consisting of contiguous forests, wetlands, rivers, lakes, and ponds, as well as coastal habitats such as barrier beaches and salt marshes. Pastures and power-line rights-of-way, which are less intensively altered than most developed areas, were also included since they provide habitat and connectivity for many species. Collectively, these natural cover types total 3.6 million acres across the state. An Ecological Integrity assessment was used to identify the most intact and least fragmented areas. These large Landscape Blocks are most likely to maintain dynamic ecological processes such as buffering, connectivity, natural disturbance, and hydrological regimes, all of which help to support wide-ranging wildlife species and many other elements of biodiversity.

In order to identify critical Landscape Blocks in each ecoregion, different Ecological Integrity thresholds were used to select the largest intact landscape patches in each ecoregion while avoiding altered habitat as much as possible. This ecoregional representation accomplishes a key goal of *BioMap2* to protect the ecological stages that support a broad suite of biodiversity in the context of climate change. Blocks were defined by major roads, and minimum size thresholds differed among ecoregions to ensure that *BioMap2* includes the best of the best in each ecoregion.

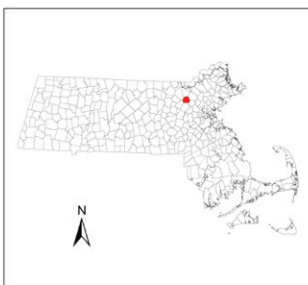




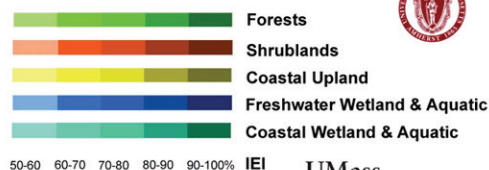
# CAPS Index of Ecological Integrity (IEI) Town of CARLISLE, MA



Updated November 2011



## IEI, Index of Ecological Integrity Top 50% of the Landscape



**UMass  
Extension**  
CENTER FOR AGRICULTURE



The IEI, or Index of Ecological Integrity, delineates the relative wildlife habitat and biodiversity value of any point on the landscape based on landscape ecology principles and expert opinion. The IEI is calculated by the Conservation Assessment and Prioritization System (CAPS) computer program developed at the University of Massachusetts, Amherst. Depicted on this map are those areas representing 50% of the landscape with the highest IEI values; the darker the color the higher the integrity value. For more information see: <http://www.masscaps.org>.

Coastal beaches and rocky intertidal shores are included as Coastal Wetland and Aquatic.

These maps were funded by grants from The Nature Conservancy and the Federal Highway Administration via a grant administered by the Massachusetts Department of Transportation, the Massachusetts Department of Environmental Protection and the U.S. Environmental Protection Agency under section 104 (b) (3) of the U.S. Clean Water Act. Data sources include the Office of Geographic and Environmental Information (MassGIS).

Prepared in cooperation with the Massachusetts Department of Transportation Office of Transportation Planning, and the United States Department of Transportation, Federal Highway Administration. The contents of this report reflect the views of the author(s), who is (are) responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the Massachusetts Department of Transportation or the Federal Highway Administration. This report does not constitute a standard, specification, or regulation.

## Appendix D The Biodiversity of Carlisle

APPENDIX

# D

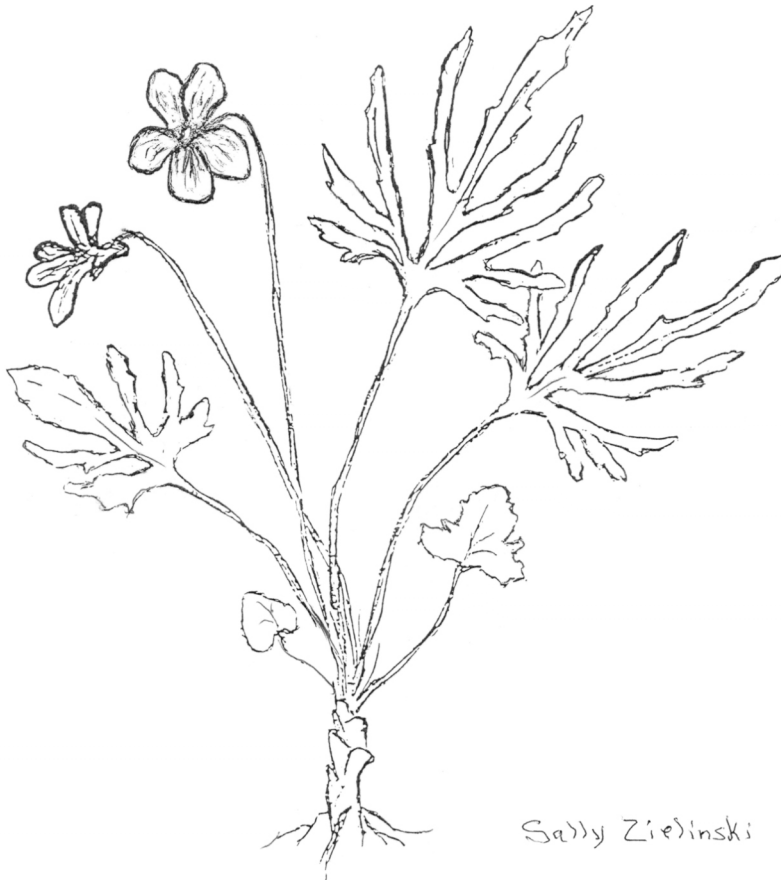
**Introduction** D-1

**Wild Plants, Animals, and Other Organisms in Carlisle**

I. GREEN ALGAE	D-3
II. PLASMODIAL SLIME MOLDS	D-3
III. FUNGI & LICHENS	D-4
IV. MOSSES & LIVERWORTS	D-12
V. VASCULAR PLANTS	D-13
VI. INVERTEBRATE ANIMALS	D-26
VII. VERTEBRATE ANIMALS	D-44

**Invasive and Other Problem Plants** D-55

**Forest Pests and Diseases** D-57



*Carlisle's best-known rare plant is Britton's (Coast) Violet  
(Viola brittoniana).*



## Appendix D: The Biodiversity of Carlisle

### Introduction to List of Wild Plants, Animals, and Other Organisms in Carlisle

This updated and expanded compilation of Carlisle's biota includes nearly 1800 entries, most identified to species. From the first list compiled by Susan Emmons and Betsy Fell for the 2000 Open Space and Recreation Plan, the document has become more comprehensive with each edition. Several major groups have been added to the 2020 list: Mosses & Liverworts, Plasmodial Slime Molds, and Green Algae. The 470 entries new since 2013 include two rare insects, a Tardigrade, and a Moss Animal.

Botanist/plant ecologist Sally Zielinski led a team of Carlisle biological experts and amateur naturalists who spent countless hours walking fields and forests, uplands and wetlands to locate, photograph, and otherwise document the Town's flora and fauna. Their work confirms the old adage: "The more you look, the more you find."

Major contributors to this document include: Alan Ankers, Judy Asarkof, Tom Brownrigg, Peter Burn, Ken Harte, Kay Hurley, Helen Lyons, Marc Lamere, Steve Spang, and Sylvia Willard. Important information and help were also provided by Edward Reiner of the US Environmental Protection Agency, Roy Herold, Andrew Joslin, Rhonda Michaud, and Bob Zielinski. Some plant information came from a Sudbury Valley Trustees' survey of the Elliott Preserve.

Observations were made through July 2020. Many species on previous lists have been reconfirmed. These and new finds are backed up with photos. Data were gathered as to who observed the species, when, and where. The hope is this information will become part of a growing database and website for the Town.

Taxonomic levels above family are numbered and the number of species in the group shown in ( ) following the common name. Within groups, family, genus, and species (and often order) are alphabetical by scientific name. A blank or N/A in the common name column means none is available. For the first time, characteristics of species are included. Those that are applicable and could be reasonably obtained vary by group. Characteristics and codes for each are explained on the following page.



## Characteristics and Codes Used in List of Wild Plants, Animals, and Other Organisms in Carlisle

### Native Status

N	Native (to the U.S. or Middlesex County)
I	Introduced
Inv	Invasive (for plants so designated by the Massachusetts Invasive Plant Advisory Group and/or the SuAsCo Cooperative Invasive Species Management Area (CISMA))
PD	Pest or disease agent of forest trees
NT	Native Transplant (for Bony Fishes native to the U.S., moved outside their historic home range)
NH	Native Hybrid (of two species of Bony Fishes native to the U.S.)

**Rare or Uncommon Status** (per the Massachusetts Endangered Species Act (MESA) list prepared by the Natural Heritage and Endangered Species Program (NHESP) and the Massachusetts State Wildlife Action Plan prepared by the Division of Fisheries and Wildlife)

E	Endangered
T	Threatened
SC	Special Concern
WL	Watch List (for plants)
AP	State Wildlife Action Plan

### Occurrence (for birds; more than one may apply)

b	believed breeding
y	year-round
s	summer
w	winter
m	passage migrant
o	occasional
v	vagrant

### Life Form (for most Vascular Plants)

Tree
Shrub
Vine
Herb

### Time Frame

New	First observed since 2013. Listings from earlier records are not designated "New."
Old	Not observed in several decades
Hist	Historic record with NHESP

# Wild Plants, Animals, and Other Organisms in Carlisle

## I. GREEN ALGAE (4)

## CHLOROPHYTA

COMMON NAME	GENUS AND SPECIES	STATUS
N/A	<b><i>Closteriaceae</i></b> <i>Closterium sp.</i>	New
N/A	<b><i>Desmidiaceae</i></b> <i>Desmidium schwartzii</i>	New
N/A	<i>Microsterias rotata</i>	New
N/A	<b><i>Trentepohliaceae</i></b> <i>Trentepohlia sp.</i>	New

## II. PLASMODIAL SLIME MOLDS (18)

## MYXOMYCOTA

### II A. (1)

### Ceratiomyxales

COMMON NAME	GENUS AND SPECIES	STATUS
Coral Slime	<i>Ceratiomyxa fruticulosa</i>	

### II B. (4)

### Liceales

COMMON NAME	GENUS AND SPECIES	STATUS
N/A	<i>Cribraria sp</i>	New
Wolf's Milk Slime	<i>Lycogala epidendrum</i>	New
False Puffball	<i>Reticularia lycoperdon</i>	New
Raspberry Slime	<i>Tubifera ferruginosa</i>	New

### II C. (4)

### Physarales

COMMON NAME	GENUS AND SPECIES	STATUS
White-footed Slime	<i>Diachea leucopodia</i>	New
Dog Vomit Slime	<i>Fuligo septica</i>	New
Insect Egg Slime	<i>Leocarpus fragilis</i>	New
N/A	<i>Physarum bivalve</i>	New

### II D. (3)

### Stemonitales

COMMON NAME	GENUS AND SPECIES	STATUS
N/A	<i>Comatricha nigra</i>	New
N/A	<i>Stemonaria longa</i>	New
Chocolate Tube Slime	<i>Stemonitis axifera</i>	New

### II E. (6)

### Trichiales

COMMON NAME	GENUS AND SPECIES	STATUS
N/A	<i>Arcyria cinerea</i>	New
Carnival Candy Slime	<i>Arcyria denudata</i>	New
N/A	<i>Arcyria nutans</i>	New

N/A	<i>Hemitrichia calyculata</i>	New
Pretzel Slime	<i>Hemitrichia serpula</i>	New
Wasp Nest Slime	<i>Metatrichia vesparium</i>	New

### III. FUNGI & LICHENS (340)

#### III A. Fungi (254)

COMMON NAME	Ascomycota, Basidiomycota, Zygomycota GENUS AND SPECIES	STATUS
<b>III A 1. Agarics (91)</b>	<b>Agaricales</b>	
Wood Mushroom	<i>Agaricus silvaticus</i>	
Hard Agrocybe	<i>Agrocybe dura</i>	New
Destroying Angel	<i>Amanita bisporigera</i>	
Cleft-foot Amanita	<i>Amanita brunescens</i>	
Strangulated Amanita	<i>Amanita ceciliae</i>	
Coker's Amanita	<i>Amanita cokeri</i>	
Crenulate Amanita	<i>Amanita crenulata</i>	
Yellow Patches Amanita	<i>Amanita flavoconia</i>	
Yellow Blusher	<i>Amanita flavorubescens</i>	
Tawny Grisette Amanita	<i>Amanita fulva</i>	
Yellow-orange Fly Amanita	<i>Amanita muscaria</i>	
Gunpowder Lepidella	<i>Amanita onusta</i>	
Panther Amanita	<i>Amanita pantherina</i>	
Blusher Amanita	<i>Amanita rubescens</i>	
Common Grisette	<i>Amanita vaginata</i>	
Volvate Amanita	<i>Amanita volvata</i>	
Honey Mushroom	<i>Armillaria mellea complex</i>	PD
Ringless Honey Mushroom	<i>Armillaria tabescens</i>	New
Powder Cap	<i>Asterophora lycoperdioides</i>	New
Conifer Cone Cap	<i>Baeospora myosura</i>	New
Yellow Bolbitus	<i>Bolbitius vitellinus</i>	New
Brain Puffball	<i>Calvatia craniiformis</i>	
Giant Puffball	<i>Calvatia gigantea</i>	
Golden Spindles	<i>Clavulinopsis fusiformis</i>	
Anise-scented Clitocybe	<i>Clitocybe odora</i>	
Tuberous Collybia	<i>Collybia tuberosa</i>	
White Dunce Cap	<i>Conocybe lactea</i>	
Snowy Ink Cap	<i>Coprinopsis nivea</i>	
Shaggy Mane	<i>Coprinus comatus</i>	New
Woolly-stalked Inky Cap	<i>Coprinus lagopus</i>	
Mica Cap	<i>Coprinus micaceus</i>	New
Corrugated Cort	<i>Cortinarius corrugatus</i>	
Viscid Violet Cort	<i>Cortinarius iodes</i>	
Red-gilled Cort	<i>Cortinarius semisanguineus</i>	New
Flat Crep	<i>Crepidotus applanatus</i>	
Soft Stumpfoot	<i>Crepidotus mollis</i>	

Zoned Crinipellis	<i>Crinipellis zonata</i>	
White-egg Bird's Nest	<i>Crucibulum laeve</i>	
Dung-loving Bird's Nest	<i>Cyathus stercoreus</i>	
Golden-scruffy Collybia	<i>Cryptotrama asprata</i>	
Aborted Entoloma	<i>Entoloma abortivum</i>	
Yellow Unicorn Entoloma	<i>Entoloma murrayi</i>	New
Beefsteak Polypore	<i>Fistulina hepatica</i>	
Velvet Foot	<i>Flammulina velutipes</i>	New
Little Gym	<i>Gymnopilus penetrans</i>	
Little Brown Collybia	<i>Gymnopus alkaliverens</i>	
Oak-loving Collybia	<i>Gymnopus dryophilus</i>	
N/A	<i>Gymnopus luxurians</i>	
N/A	<i>Gymnopus subnudus</i>	
Leaflike Oyster	<i>Hohenbuehelia petaloides</i>	
Yellow-centered Waxy Cap	<i>Hygrophorus flavodiscus</i>	
Sulphur Tuft Mushroom	<i>Hypholoma fasciculare</i>	
Brick Cap	<i>Hypholoma lateritium</i>	New
Forest Funnelcap	<i>Infundibulicybe gibba</i>	
N/A	<i>Inocybe taquamenonensis</i>	
Waxy (Common) Laccaria	<i>Laccaria laccata</i>	
Purple-gilled Laccaria	<i>Laccaria ochropurpurea</i>	
Reddening Lepiota	<i>Leucoagaricus americanus</i>	
Gem-studded Puffball	<i>Lycoperdon perlatum</i>	
Parasol Mushroom	<i>Macrolepiota procera</i>	
Fairy Threads	<i>Macrotypophula juncea</i>	
Oak-leaf Pinwheel	<i>Marasmius capillaris</i>	New
Horsehair Marasmius	<i>Marasmius rotula</i>	
Orange Pinwheel Marasmius	<i>Marasmius siccus</i>	
Platterful Mushroom	<i>Megacollihya rodmani</i>	
N/A	<i>Mycena corticola</i>	New
Yellow-stalked Mycena	<i>Mycena epipterygia</i>	
Bleeding Mycena	<i>Mycena haematopus</i>	
Garlic Marasmius	<i>Mycetinis scorodoni</i>	
Straight-stalk Pinkgill	<i>Nolanea (Entoloma) strictius</i>	
N/A	<i>Omphalina ectypoides</i>	
Jack-o-lantern	<i>Omphalotus olearius</i>	
Petticoat Mottlegill	<i>Panaeolus papilionaceus</i>	New
Night Light	<i>Panellus stipticus</i>	
Sharp Scaly Pholiota	<i>Pholiota squarrosoides</i>	
Orange Mock Oyster	<i>Phyllotopsis nidulans</i>	New
Oyster Mushroom	<i>Pleurotus ostreatus</i>	
Summer Oyster Mushroom	<i>Pleurotus pulmonarius</i>	New
Fawn (Deer) Mushroom	<i>Pluteus cervinus</i>	
Pendulous-disc Polypore	<i>Porodiscus pendulus</i>	
Common Psathyrella	<i>Psathyrella candolleana</i>	
White Coral Fungus	<i>Ramariopsis kunzei</i>	New
Spotted Collybia	<i>Rhodocollybia maculata</i>	

Late Fall Oyster Mushroom	<i>Sarcomyxa serotina</i>	
Split Gill Mushroom	<i>Schizophyllum commune</i>	
Wine Cap	<i>Stropharia rugoso-annulata</i>	
Velvet-footed Pax	<i>Tapinella atrotomentosa</i>	
Decorated Mop	<i>Tricholomopsis decora</i>	
Plums & Custard	<i>Tricholomopsis rutilans</i>	
Fuzzy Foot (Golden Trumpets)	<i>Xeromphalina campanella</i>	
Rooted Collybia	<i>Xerula furfuracea</i>	
<b>III A 2. (1)</b>	<b>Amylocorticiales</b>	
Crimp Gill	<i>Plicaturopsis crispa</i>	New
<b>III A 3. (2)</b>	<b>Auriculariales</b>	
Black Witches' Butter	<i>Exidia glandulosa</i>	New
Amber Jelly Roll	<i>Exidia recisa</i>	
<b>III A 4. Boletes &amp; Allies (30)</b>	<b>Boletales</b>	
Russell's Bolete	<i>Aureoboletus russellii</i>	
Bicolor Bolete	<i>Baorangia bicolor</i>	New
Ash-tree Bolete	<i>Boletinellus merulioides</i>	
King Bolete	<i>Boletus edulis</i>	
Frost's Bolete	<i>Boletus frostii</i>	
Pale Bolete	<i>Boletus pallidus</i>	
Parasitic Bolete	<i>Boletus parasiticus</i>	New
Sensitive Bolete	<i>Boletus sensibilis</i>	
N/A	<i>Boletus subluridellus</i>	
Red-mouth Bolete	<i>Boletus subvelutipes</i>	
Stalked Puffball in Aspic	<i>Calostoma cinnabarina</i>	
Winecap Chroogomphus	<i>Chroogomphus vinicolor</i>	New
Chestnut Bolete	<i>Gyroporus castaneus</i>	
Chrome-footed Bolete	<i>Harrya chromapes</i>	
False Chanterelle	<i>Hygrophoropsis aurantiaca</i>	
Bent-foot Bolete	<i>Leccinum longicurvipes</i>	
Dead Man's Foot	<i>Pisolithus arenarius</i>	
Ornate-stalked Bolete	<i>Retiboletus ornatipes</i>	
N/A	<i>Scleroderma cepa</i>	
Pigskin Poison Puffball	<i>Scleroderma citrinum</i>	
Old Man of the Woods	<i>Strobilomyces floccopus</i>	
Chicken-fat Suillus	<i>Suillus americanus</i>	
Dotted Stalk Suillus	<i>Suillus granulatus</i>	
Painted Bolete	<i>Suillus pictus</i>	
Black Velvet Bolete	<i>Tylopilus alboater</i>	
Bitter Bolete	<i>Tylopilus felleus</i>	
N/A	<i>Tylopilus rubrobrunneus</i>	
Spotted Bolete	<i>Xanthoconium affine</i>	
Lilac Bolete	<i>Xanthoconium separans</i>	
Red-cracked Bolete	<i>Xerocomellus chrysenteron</i>	
<b>III A 5. (1)</b>	<b>Boliniales</b>	
Dog Nose	<i>Camarops petersii</i>	

**III A 6. Chanterelles & Allies (10)**

Common Chanterelle  
 Cinnabar-red Chanterelle  
 Small Chanterelle  
 Gray Coral Fungus  
 Crested Coral Fungus  
 Ashen Trumpet  
 Black Trumpet (Horn of Plenty)  
 Black Trumpet  
 Trumpet Chanterelle  
 Hedgehog Mushroom

**III A 7. Jelly Fungi (3)**

Yellow Tuning Fork  
 Orange Jelly Fungus (Witches' Butter)  
 Jelly Spot Fungus

**III A 8. (2)**

Alpine Rose Apple  
 Blueberry Gall

**III A 9. Earth Tongues (2)**

Farlow's Black Earth Tongue  
 Velvety Earth Tongue

**III A 10. (1)**

Train Wrecker

**III A 11. (1)**

Flat-topped Coral

**III A 12. (5)**

Black Jelly Drops  
 Blue Stain Fungus  
 Yellow Stain  
 Hairy Fairy Cups  
 Swamp Beacon  
 N/A

**III A 13. (2)**

Shiny Cinnamon Polypore  
 Wasp's Nest Polypore

**III A 14. (11)**

Golden Thread Cordyceps  
 N/A  
 Yellow Cushion Hypocrea  
 N/A  
 Amanita Mold  
 Lobster Mushroom  
 N/A  
 Russula Mold  
 Coral-spot Nectria Canker  
 N/A  
 N/A

**Cantharellales**

*Cantharellus cibarius*  
*Cantharellus cinnabarinus*  
*Cantharellus minor*  
*Clavulina cinerea*  
*Clavulina cristata*  
*Craterellus cinereus* New  
*Craterellus cornucopioides* New  
*Craterellus fallax*  
*Craterellus tubaeformis* New  
*Hydnum repandum*

**Dacrymycetales**

*Calocera viscosa*  
*Dacrymyces palmatus*  
*Dacrymyces stillatus*

**Exobasidiales**

*Exobasidium rhododendri* New  
*Exobasidium vaccinii* New

**Geoglossales**

*Trichoglossum farlowii*  
*Trichoglossum hirsutum*

**Gleophyllales**

*Neolentinus lepideus*

**Gomphales**

*Clavariadelphus truncatus* New

**Helotiales**

*Bulgaria inquinans*  
*Chlorociboria aerugenascens*  
*Chlorosplenium chlora*  
*Dasyscyphus virgineus*  
*Mitrula elegans*  
*Phaeohelotium epiphyllum* New

**Hymenochaetales**

*Coltricia cinnamomea*  
*Coltriciella dependens* New

**Hypocreales**

*Cordyceps ophioglossoides*  
*Elaphocordyceps longisegmentis*  
*Hypocrea gelatinosa*  
*Hypocrea pulvinata*  
*Hypomyces hyalinus*  
*Hypomyces lactifluorum*  
*Hypomyces lateritius*  
*Hypomyces luteovirens* New  
*Nectria cinnabarina* PD  
*Polycephalomyces tomentosus* New  
*Torrubiella sp* New

**III A 15. (1)**

Jelly Babies

**III A 16. (1)**

Hat Thrower

**III A 17. (1)**

Pygmy Parasite

**III A 18. (13)**

N/A

Orange Peel

Hairy Rubber Cup

Thick-stalked False Morel

Ribbed-stalked Cup

N/A

Long-stalked Gray Cup

Morel

Recurved Cup

N/A

Hairy Black Cup

Scarlet Cup

Eyelash Fungus

**III A 19. (1)**

Ravenel's Stinkhorn

**III A 20. (1)**

Black Knot of Cherry

**III A 21. Polypores (25)**

Dryad's Saddle

Northern Tooth

Thick-maze Oak Polypore

Thin-maze Flat Polypore

Tinder Polypore

Birch Polypore

Sprague's Polypore

Artist's Polypore (Artist's Conk)

Varnished Conk

Hen of the Woods

Milk-white Toothed Polypore

White-pored Chicken of the Woods

Chicken of the Woods (Sulphur Shelf)

Blackening Polypore

Dyer's Polypore

Mustard-yellow Polypore

Trembling Merulius

Winter Polypore

Little Nest Polypore

Cauliflower Mushroom

Spongy Toothed Polypore

Turkeytail

**Leotiales***Leotia lubrica***Mucorales***Pilobolus crystallinus***Mycocaliciales***Phaeocalicium polyporaeum***Pezizales***Adelphella babintonii*

New

*Aleuria aurantia**Galiella rufa**Gyromitra brunnea**Helvella acetabulum**Helvella costifera*

New

*Helvella macropus*

New

*Morchella esculenta**Peziza varia*

New

*Pithya cupressina**Pseudoplectania nigrella*

New

*Sarcoscypha austriaca**Scutellinia scutellata***Phallales***Phallus ravenelii***Pleosporales***Apiosporina morbosa***Polyporales***Cerioporus squamosus**Climacodon septrionale*

New

*Daedalea quercina**Daedaleopsis confragosa**Fomes fomentarius**Fomitopsis betulina**Fomitopsis spraguei**Ganoderma applanatum**Ganoderma lucidum**Grifola frondosa**Irpex lacteus**Laetiporus cincinnatus**Laetiporus sulphureus**Meripilus sumstinei**Phaeolus schweinitzii**Phellinus gilvus*

New

*Phlebia tremellosa**Polyporus brumalis*

New

*Poronidulus conchifer*

New

*Sparassis spathulata**Spongipellis pachyodon**Trametes versicolor*



Violet Toothed Polypore	<i>Trichaptum biforme</i>	
White Cheese Polypore	<i>Tyromyces chioneus</i>	
N/A	<i>Xenasmatella vaga</i>	New
<b>III A 22. (3)</b>	<b>Pucciniales</b>	
May Apple Rust	<i>Puccinia podophylli</i>	New
Witches' Broom on Blueberry	<i>Pucciniastrum goeppertianum</i>	
Jack-in-the-Pulpit Rust	<i>Uromyces ari-triphylli</i>	New
<b>III A 23. (1)</b>	<b>Rhytismatales</b>	
N/A	<i>Angelina rufescens</i>	
<b>III A 24. (30)</b>	<b>Russulales</b>	
Crown-tipped Coral Fungus	<i>Artomyces pyxidatus</i>	
Berkeley's Polypore	<i>Bondarzewia berkeleyi</i>	
Lion's Mane (Bear's Head)	<i>Hericeum americanum</i>	
N/A	<i>Lactarius chrysorrheus</i>	
Corrugated-cap Milky	<i>Lactarius corrugis</i>	
Deceptive Milky	<i>Lactarius deceptivus</i>	
Hygrophorus Milky	<i>Lactifluus hygrophoroides</i>	
Chocolate Milky	<i>Lactarius lignyotus</i>	
N/A	<i>Lactarius luteolus</i>	
Peck's Milky Cap	<i>Lactarius peckii</i>	New
Peppery Milky	<i>Lactarius piperatus</i>	
N/A	<i>Lactarius quietus</i>	
Velvet Lactarius	<i>Lactarius subvellereus</i>	
Yellow Latex Milky	<i>Lactarius vinaceorufescens</i>	
Voluminous-latex Milky	<i>Lactifluus volemus</i>	
Tacky Green Russula	<i>Russula aeruginea</i>	
Short-stalked White Russula	<i>Russula brevipes</i>	
Green-quilt Russula	<i>Russula crustosa</i>	
Swamp Russula	<i>Russula flava</i>	
Fragile Russula (Fragile Brittlegill)	<i>Russula fragilis</i>	
Fragrant Russula	<i>Russula fragrantissima</i>	
Almond-scented Russula	<i>Russula laurocerasi</i>	New
Purple-bloom Russula	<i>Russula mariae</i>	
N/A	<i>Russula rubescens</i>	
Variable Russula	<i>Russula variata</i>	
Blackish-red Russula	<i>Russula vinacea</i>	
Green Russula (Green Brittlegill)	<i>Russula virescens</i>	
Crowded Parchment	<i>Stereum complicatum</i>	
False Turkey Tail	<i>Stereum ostrea</i>	
Ceramic Parchment	<i>Xylobolus frustulatus</i>	
<b>III A 25. (1)</b>	<b>Sebacinales</b>	
Jellied False Coral	<i>Tremellodendron pallidum</i>	
<b>III A 26. (3)</b>	<b>Thelephorales</b>	
N/A	<i>Hydnellum scrobiculatum</i>	
N/A	<i>Phellodon confluens</i>	
Scaly Tooth Fungus	<i>Sarcodon imbricatus</i>	

**III A 27. (3)**

Leafy Brain  
 Collybia Jelly  
 Yellow Witches' Butter

**III A 28. (2)**

Cedar-apple Rust

Potentilla Rust

**III A 29. (1)**

Corn Smut

**III A 30. (5)**

N/A  
 Carbon Balls  
 Red Cushion (Beech) Hypoxylon  
 Carbon Antlers  
 Dead Man's Fingers

**III B. Lichens (86)****COMMON NAME****III B 1. (1)**

Pebble Lichen

**III B 2. (1)**

Frosted Comma Lichen

**III B 3. (3)**

Yellow Soot Lichen  
 Brown-head Stubble Lichen  
 A Stubble Lichen

**III B 4. (1)**

N/A

**III B 5. (74)**

Brown Cobblestone Lichen  
 Yellow Ribbon Lichen  
 Tiny Button Lichen  
 Sunken Disc Lichen  
 Cinder Lichen  
 Sunken Disc Lichen  
 Burred Horsehair Lichen  
 Sulphur Rock Firedot Lichen  
 Lemon Candle-flame Lichen  
 Hidden Gold-speck Lichen  
 Powdery Gold-speck Lichen  
 Common Gold-speck Lichen  
 Spiny Heath Lichen  
 Sea-storm Lichen  
 Green Reindeer Lichen  
 Stalkless Cladonia  
 Common Powderhorn

**Tremellales**

*Phaeotremella foliacea* New  
*Syzygospora mycetophila*  
*Tremella mesenterica*

**Uredinales**

*Gymnosporangium juniperi-virginianae*  
*Pucciniastrum potentillae* New

**Ustilaginales**

*Ustilago maydis*

**Xylariales**

*Camillea punctulata* New  
*Daldinia concentrica*  
*Hypoxylon fragiforme*  
*Xylaria hypoxylon*  
*Xylaria polymorpha*

**Ascomycota****GENUS AND SPECIES****STATUS****Agyriales**

*Trapelia involuta*

**Arthoniales**

*Arthonia caesia*

**Caliciales**

*Calicium tigillare* New  
*Chaenotheca bruneola* New  
*Mycocalicium subtile* New

**Gyalectales**

*Coenogonium pineti* New

**Lecanorales**

*Acarospora fuscata*  
*Allocetraria oakesiana* New  
*Amandinea punctata*  
*Aspicilia caesiocinerea*  
*Aspicilia cinerea*  
*Aspicilia verrucigera*  
*Bryoria furcellata*  
*Caloplaca flavovirescens*  
*Candelaria concolor*  
*Candelariella aurella*  
*Candelariella efflorescens*  
*Candelariella vitellina*  
*Cetraria arenaria*  
*Cetrelia chicitae*  
*Cladina mitis*  
*Cladonia apodocarpa*  
*Cladonia coniocraea*

British Soldiers	<i>Cladonia cristatella</i>	
Many-forked Cladonia	<i>Cladonia furcata</i>	
Mealy Pixie Cup	<i>Cladonia grayi</i>	
Lipstick Lichen	<i>Cladonia macilenta</i>	
Fence-rail Cladonia	<i>Cladonia parasitica</i>	
Dragon Cladonia	<i>Cladonia squamosa</i>	
Thorn Cladonia	<i>Cladonia uncialis</i>	
Fingered Jelly Lichen	<i>Collema cristatum</i>	New
Pink Earth Lichen	<i>Dibaeis baeomyces</i>	
Golden Moonglow Lichen	<i>Dimelaena oreina</i>	
Boreal Oakmoss Lichen	<i>Evernia mesomorpha</i>	
Rock Greenshield Lichen	<i>Flavoparmelia baltimorensis</i>	
Common Greenshield Lichen	<i>Flavoparmelia caperata</i>	
Powdered Fringe Lichen	<i>Heterodermia speciosa</i>	New
Common Clam Lichen	<i>Hypocenomyce scalaris</i>	
Hooded Tube Lichen	<i>Hypogymnia physodes</i>	
Common Toadskin Lichen	<i>Lasallia papulosa</i>	
Mortar Rim Lichen	<i>Lecanora dispersa</i>	
Bumpy Rim Lichen	<i>Lecanora hybocarpa</i>	
Mealy Rim Lichen	<i>Lecanora strobilina</i>	
Fused Rim Lichen	<i>Lecanora symmicta</i>	
Mapledust Lichen	<i>Lecanora thysanophora</i>	
Blue Jellyskin Lichen	<i>Leptogium cyanescens</i>	
Abraded Camouflage Lichen	<i>Melanelixia subaurifera</i>	
Erratic Dot Lichen	<i>Micarea erratica</i>	
Fringed Kidney Lichen	<i>Nephroma helveticum</i>	New
A Saucer Lichen	<i>Ochrolechia arborea</i>	
Bottlebrush Shield Lichen	<i>Parmelia squarrosa</i>	
Hammered Shield Lichen	<i>Parmelia sulcata</i>	
Powdered Ruffle Lichen	<i>Parmotrema hypotropum</i>	New
Alternating Dog Lichen	<i>Peltigera didactyla</i>	
Field Dog Lichen	<i>Peltigera rufescens</i>	
Bitter Wart Lichen	<i>Pertusaria amara</i>	
Powder-tipped Shadow Lichen	<i>Phaeophyscia adiastrum</i>	
Pompon Shadow Lichen	<i>Phaeophyscia pusilloides</i>	
Orange-cored Shadow Lichen	<i>Phaeophyscia rubropulchra</i>	
Hooded Rosette Lichen	<i>Physcia adscendens</i>	
Hoary Rosette Lichen	<i>Physcia aipolia</i>	
Mealy Rosette Lichen	<i>Physcia millegrana</i>	
Star Rosette Lichen	<i>Physcia stellaris</i>	
Varied Rag Lichen	<i>Platismatia glauca</i>	New
Crumpled Rag Lichen	<i>Platismatia tuckermanii</i>	New
Common Coal-dust Lichen	<i>Polysporina simplex</i>	
Smoky-eye Boulder Lichen	<i>Porpidia albocaerulescens</i>	
Sulphur Dust Lichen	<i>Psilolechia lucida</i>	
Rough Speckled Shield Lichen	<i>Punctelia rudecta</i>	
A Crimson Dot Lichen	<i>Pyrrhospora varians</i>	

Sinewed Ramalina Lichen  
 Dusky Map Lichen  
 Scattered Rock-posy Lichen  
 Fringed Wrinkle Lichen  
 Smooth Rock Tripe  
 Bristly Beard Lichen  
 Common Beard Lichen (Old Man's Beard)  
 Peppered Rock-shield Lichen  
 Elegant Sunburst Lichen  
 Bare-bottomed Sunburst Lichen

**III B 6. (3)**

Aggressive Crater Lichen  
 Common Script Lichen  
 N/A

**III B 7. (1)**

Streamside Stippleback Lichen

**III B 8. (2)**

A Dust Lichen  
 Zoned Dust Lichen

*Ramalina americana*  
*Rhizocarpon obscuratum*  
*Rhizoplaca subdiscrepans*  
*Tuckermanopsis americana*  
*Umbilicaria mammulata*  
*Usnea hirta*  
*Usnea subfloridana*  
*Xanthoparmelia conspersa*  
*Xanthoria elegans*  
*Xanthoria fulva*

**Ostropales**

*Diploschistes scruposus*  
*Graphis scripta*  
*Julella fallaciosa*

**Verrucariales**

*Dermatocarpon luridum*

**Order Undecided**

*Lepraria caesiaalba*  
*Lepraria neglecta*

**IV. MOSSES & LIVERWORTS (11)**

**IV A. Mosses (6)**

**COMMON NAME**

**IV A 1. (1)**

Woodsy Thyme Moss

**IV A 2. (1)**

Feather Moss

**IV A 3. (1)**

Curly-leafed Ulota

**IV A 4. (2)**

Common Hair Cap Moss  
 Soft Hair Cap Moss

**IV A 5. (1)**

Magellan's Peat Moss

**IV B. Liverworts (5)**

**COMMON NAME**

**IV B 1. (3)**

Greater Whipwort (Threelobed Bazzania)  
 A Cephalozia  
 Rustwort

**IV B 2. (1)**

Ribbonwort (Veilwort)

**IV B 3. (1)**

New York Scalewort

**Bryophyta**

**GENUS AND SPECIES**

**STATUS**

**Bryales**

*Plagiomnium cuspidatum*

N, New

**Hypnales**

*Hypnum imponens*

N, New

**Orthotrichales**

*Ulota crispa*

N, New

**Polytrichales**

*Polytrichum commune*

N, New

*Polytrichum piliferum*

N, New

**Sphagnales**

*Sphagnum magellanicum*

N, New

**Marchantiophyta**

**GENUS AND SPECIES**

**STATUS**

**Jungermanniales**

*Bazzania trilobata*

N, New

*Cephalozia sp.*

N, New

*Nowellia curvifolia*

N, New

**Pallaviciniales**

*Pallavicinia lyellii*

N, New

**Porellales**

*Frullania eboracensis*

N, New

## V. VASCULAR PLANTS (508)

### V A. Club Mosses (7)

#### COMMON NAME

#### Fir Mosses

Shining Fir Moss

#### Ground Pines & Ground Cedars

Prickly Tree Club Moss

Hickey's Tree Club Moss

Princess Pine

Southern Ground Cedar

Slender Ground Cedar

Staghorn Club Moss

### V B. Ferns & Allies (20)

#### COMMON NAME

#### Spleenworts

Ebony Spleenwort

#### Lady Ferns

Northern Lady Fern

#### Hay Scented Ferns

Hay Scented Fern

Bracken

#### Wood Ferns

Spinulose Wood Fern

Crested Wood Fern

Intermediate Wood Fern

Marginal Wood Fern

Christmas Fern

#### Horsetails

Field Horsetail

#### Sensitive Ferns

Ostrich Fern

Sensitive Fern

#### Flowering Ferns

Interrupted Fern

Royal Fern

Cinnamon Fern

#### Polypodys

Rock Polypody

#### Maidenhair Ferns

Maidenhair Fern

#### Climbing Ferns

Climbing Fern

#### Marsh Ferns

New York Fern

Marsh Fern

### Lycopodiophyta

#### GENUS AND SPECIES

#### STATUS

#### Huperziaceae

*Huperzia lucidula*

N

#### Lycopodiaceae

*Dendrolycopodium dendroideum*

N, New

*Dendrolycopodium hickeyi*

N, New

*Dendrolycopodium obscurum*

N

*Diphasiastrum digitatum*

N

*Diphasiastrum tristachyum*

N

*Lycopodium clavatum*

N

### Pteridophyta

#### GENUS AND SPECIES

#### STATUS

#### Aspleniaceae

*Asplenium platyneuron*

N, Herb

#### Athyriaceae

*Athyrium augustum*

N, Herb

#### Dennstaedtiaceae

*Dennstaedtia punctiloba*

N, Herb

*Pteridium aquilinum* var. *latiusculum*

N, Herb

#### Dryopteridaceae

*Dryopteris carthusiana*

N, Herb

*Dryopteris cristata*

N, Herb

*Dryopteris intermedia*

N, Herb

*Dryopteris marginalis*

N, Herb

*Polystichum acrostichoides*

N, Herb

#### Equisetaceae

*Equisetum arvense*

N, Herb

#### Onocleaceae

*Matteuccia struthiopteris*

N, Herb

*Onoclea sensibilis*

N, Herb

#### Osmundaceae

*Osmunda claytoniana*

N, Herb

*Osmunda regalis*

N, Herb

*Osmundastrum cinnamomeum*

N, Herb

#### Polypodiaceae

*Polypodium virginianum*

N, Herb

#### Pteridaceae

*Adiantum pedatum*

N, Herb

#### Schizaceae

*Lygodium palmatum*

N, SC, Vine

#### Thelypteridaceae

*Parathelypteris noveboracensis*

N, Herb

*Thelypteris palustris*

N, Herb

**V C. Conifers (13)****COMMON NAME****Cedars & Junipers**

Atlantic White Cedar  
Common Juniper  
Eastern Red Cedar  
Northern White Cedar (Arbor Vitae)

**Pines & Spruces**

Balsam Fir  
American Larch (Tamarack)  
Norway Spruce  
Black Spruce  
Red Pine  
Pitch Pine  
Eastern White Pine  
Scotch Pine  
Eastern Hemlock

**V D. Monocots (93)****COMMON NAME****Sweet Flags**

Several-veined Sweet Flag

**Water Plantains**

Common Arrowhead

**Arums**

Jack-in-the-Pulpit  
Common Duckweed  
Arrow-arum  
Skunk Cabbage

**Asparaguses**

Asparagus

**Bellworts**

Sessile-leaved Bellwort

**Spiderworts**

Asiatic Dayflower

**Sedges**

Woodland Sedge  
Button Sedge  
Awned Sedge  
Stalked Sedge  
Bladder Sedge  
Lakeside Sedge  
Woolly-fruited Sedge  
Hop Sedge  
Sallow Sedge  
Few-seeded Sedge  
Hare's-foot Sedge

**Coniferophyta****GENUS AND SPECIES****STATUS****Cupressaceae**

*Chamaecyparis thyoides* N, Tree  
*Juniperus communis* N, Shrub  
*Juniperus virginiana* N, Tree  
*Thuja occidentalis* N, E, Tree

**Pinaceae**

*Abies balsamea* N, Tree  
*Larix laricina* N, Tree  
*Picea abies* I, Tree  
*Picea mariana* N, Tree  
*Pinus resinosa* N, WL, Tree  
*Pinus rigida* N, Tree  
*Pinus strobus* N, Tree  
*Pinus sylvestris* I, Tree  
*Tsuga canadensis* N, Tree

**Magnoliophyta: Monocots****GENUS AND SPECIES****STATUS****Acoraceae**

*Acorus americanus* N, Herb

**Alismataceae**

*Sagittaria latifolia* N, Herb

**Araceae**

*Arisaema triphyllum* N, Herb  
*Lemna minor* N, Herb  
*Peltandra virginica* N, Herb  
*Symplocarpus foetidus* N, Herb

**Asparagaceae**

*Asparagus officinalis* I, Herb

**Colchicaceae**

*Uvularia sessilifolia* N, Herb

**Commelinaceae**

*Commelina communis* I, Herb

**Cyperaceae**

*Carex blanda* N, Herb  
*Carex bullata* N, Herb  
*Carex crinita* N, Herb  
*Carex debilis* var. *rudgei* N, Herb  
*Carex intumescens* N, Herb, New  
*Carex lacustris* N, Herb  
*Carex lasiocarpa* I, Herb  
*Carex lupulina* N, Herb  
*Carex lurida* N, Herb  
*Carex oligosperma* N, E, Herb, Hist  
*Carex ovalis* I, Herb



Pennsylvania Sedge	<i>Carex pensylvanica</i>	N, Herb
Tussock Sedge	<i>Carex stricta</i>	N, Herb
Swan's Sedge	<i>Carex swanii</i>	N, Herb
Fox Sedge	<i>Carex vulpinoidea</i>	N, Herb
Three-way Sedge	<i>Dulichium arundinaceum</i>	N, Herb
Slender Spike Rush	<i>Eleocharis tenuis</i>	N, Herb
Dark Green Bulrush	<i>Scirpus atrovirens</i>	N, Herb
Wool Grass	<i>Scirpus cyperinus</i>	N, Herb
Georgia Bulrush	<i>Scirpus georgianus</i>	N, Herb
<b>Day-lilies</b>	<b><i>Hemerocallidaceae</i></b>	
Orange Day-lily	<i>Hemerocallis fulva</i>	I, Herb
<b>Bluebells</b>	<b><i>Hyacinthaceae</i></b>	
Nap at Noon	<i>Ornithogalum umbellatum</i>	I, Herb
<b>Irises</b>	<b><i>Iridaceae</i></b>	
Yellow Iris	<i>Iris pseudacorus</i>	Inv, Herb, New
Northern Blue Flag	<i>Iris versicolor</i>	N, Herb
Stout Blue-eyed Grass	<i>Sisyrinchium angustifolium</i>	N, Herb
Eastern Blue-eyed Grass	<i>Sisyrinchium atlanticum</i>	N, Herb
Meadow Blue-eyed Grass	<i>Sisyrinchium montanum</i>	N, Herb
<b>Rushes</b>	<b><i>Juncaceae</i></b>	
Soft Rush	<i>Juncus effusus</i>	I, Herb
Common Wood Rush	<i>Luzula multiflora ssp. multiflora</i>	N, Herb
<b>Lilies</b>	<b><i>Liliaceae</i></b>	
Trout Lily	<i>Erythronium americanum</i>	N, Herb
Canada Lily	<i>Lilium canadense</i>	N, Herb
Indian Cucumber Root	<i>Medeola virginiana</i>	N, Herb
<b>Trilliums &amp; Bunchflowers</b>	<b><i>Melanthiaceae</i></b>	
Nodding Trillium	<i>Trillium cernuum</i>	N, Herb
Purple Trillium	<i>Trillium erectum</i>	N, Herb
False Hellebore	<i>Veratrum viride</i>	N, Herb
<b>Orchids</b>	<b><i>Orchidaceae</i></b>	
Arethusa (Dragon's Mouth)	<i>Arethusa bulbosa</i>	N, T, Herb, Hist
Pink Lady's Slipper	<i>Cypripedium acaule</i>	N, Herb
Broad-leaved Helleborine	<i>Epipactis helleborine</i>	I, Herb, New
Downy Rattlesnake Plantain	<i>Goodyera pubescens</i>	N, Herb
Small Green Wood Orchid	<i>Platanthera clavellata</i>	N, Herb, New
Ragged-fringed Orchid	<i>Platanthera lacera</i>	N, Herb
Nodding Ladies' Tresses	<i>Spiranthes cernua</i>	N, Herb
<b>Grasses</b>	<b><i>Poaceae</i></b>	
Marsh Bent Grass	<i>Agrostis stolonifera</i>	I, Herb
Sweet Vernal Grass	<i>Anthoxanthum odoratum</i>	I, Herb
Smooth Brome	<i>Bromus inermis</i>	I, Herb, New
Cheatgrass	<i>Bromus tectorum</i>	I, Herb, New
Canada Bluejoint (Reed Grass)	<i>Calamagrostis canadensis</i>	N, Herb, WL
	<i>var. canadensis</i>	
Slender Wood Reed	<i>Cinna latifolia</i>	N, Herb
Orchard Grass	<i>Dactylis glomerata</i>	I, Herb

Deer-tongue Panic Grass	<i>Dichanthelium clandestinum</i>	N, Herb, New
Large Crab Grass	<i>Digitaria sanguinalis</i>	I, Herb
Purple Love Grass	<i>Eragrostis spectabilis</i>	N, Herb, New
Hair Fescue	<i>Festuca filiformis</i>	I, Herb
Red Fescue	<i>Festuca rubra</i>	I, Herb
Coastal Mannagrass	<i>Glyceria obtusa</i>	N, Herb
Fowl Mannagrass	<i>Glyceria striata</i>	N, Herb
Rice Cut Grass	<i>Leersia oryzoides</i>	N, Herb
Japanese Stilt Grass	<i>Microstegium vimineum</i>	Inv, Herb, New
Slender Beadgrass	<i>Paspalum setaceum</i>	N, Herb, New
Reed Canary Grass	<i>Phalaris arundinacea</i>	Inv, Herb, New
Timothy Grass	<i>Phleum pratense</i>	N, Herb
Common Reed	<i>Phragmites australis</i>	Inv, Herb, New
Kentucky Blue Grass	<i>Poa pratensis</i>	I, Herb
Little Bluestem	<i>Schizachyrium scoparium</i>	N, Herb
Nodding Foxtail	<i>Setaria faberi</i>	I, Herb
Yellow Foxtail	<i>Setaria pumila</i>	I, Herb
Green Foxtail	<i>Setaria viridis</i>	I, Herb
Shining Wedgegrass	<i>Sphenopholis nitida</i>	N, Herb, T
Wild Rice	<i>Zizania aquatica</i>	N, Herb
<b>Pickrel Weeds</b>	<b><i>Pontederiaceae</i></b>	
Pickrel Weed	<i>Pontederia cordata</i>	N, Herb
<b>Pondweeds</b>	<b><i>Potamogetonaceae</i></b>	
Curly-leaved Pondweed	<i>Potamogeton crispus</i>	Inv, Herb, New
Ribbon-leaved Pondweed	<i>Potamogeton epihydrus</i>	N, Herb
Floating Pondweed	<i>Potamogeton natans</i>	N, Herb
<b>Solomon's Seals</b>	<b><i>Ruscaceae</i></b>	
Canada Mayflower	<i>Maianthemum canadense</i>	N, Herb
False Solomon's Seal	<i>Maianthemum racemosum</i>	N, Herb
Star-like False Solomon's Seal	<i>Maianthemum stellatum</i>	N, Herb, New
Giant Solomon's Seal	<i>Polygonatum biflorum</i>	N, Herb
Solomon's Seal	<i>Polygonatum pubescens</i>	N, Herb
<b>Greenbriers</b>	<b><i>Smilacaceae</i></b>	
Sawbrier	<i>Smilax glauca</i>	N, Herb
Smooth Carrion Flower	<i>Smilax herbacea</i>	N, Herb
Round-leaved Greenbrier	<i>Smilax rotundifolia</i>	N, Herb
<b>Cattails</b>	<b><i>Typhaceae</i></b>	
Bur Reed	<i>Sparganium sp.</i>	N, Herb
Narrow-leaved Cattail	<i>Typha angustifolia</i>	N, Herb
Broad-leaved Cattail	<i>Typha latifolia</i>	N, Herb
<b>V E. Dicots (375)</b>	<b><i>Magnoliophyta: Dicots</i></b>	
<b>COMMON NAME</b>	<b>GENUS AND SPECIES</b>	<b>STATUS</b>
<b>Amaranth</b>	<b><i>Amaranthaceae</i></b>	
Lamb's Quarters	<i>Chenopodium album</i>	I, Herb
<b>Cashews &amp; Sumacs</b>	<b><i>Anacardiaceae</i></b>	
Staghorn Sumac	<i>Rhus hirta</i>	N, Shrub

Poison Ivy	<i>Toxicodendron radicans</i>	N, Vine
Poison Sumac	<i>Toxicodendron vernix</i>	N, Shrub
<b>Carrots &amp; Parsleys</b>	<b><i>Apiaceae</i></b>	
Bishop's Goutweed	<i>Aegopodium podagraria</i>	Inv, Herb, New
Fool's Parsley	<i>Aethusa cynapium</i>	I, Herb
Wild Sarsaparilla	<i>Aralia nudicaulis</i>	N, Herb
Queen Anne's Lace	<i>Daucus carota</i>	I, Herb
American Marsh Pennywort	<i>Hydrocotyle americana</i>	N, Herb
<b>Dogbanes &amp; Milkweeds</b>	<b><i>Apocynaceae</i></b>	
Spreading Dogbane	<i>Apocynum androsaemifolium</i>	N, Herb
Hemp Dogbane	<i>Apocynum cannabinum</i>	N, Herb, New
Swamp Milkweed	<i>Asclepias incarnata</i>	N, Herb
Purple Milkweed	<i>Asclepias purpurascens</i>	N, E, Herb, Hist
Common Milkweed	<i>Asclepias syriaca</i>	N, Herb
Orange Milkweed (Butterfly Weed)	<i>Asclepias tuberosa</i>	N,WL, Herb
Black Swallowwort	<i>Cynanchum louiseae</i>	Inv, Vine
Lesser Periwinkle	<i>Vinca minor</i>	I, Vine
<b>Hollies</b>	<b><i>Aquifoliaceae</i></b>	
Winterberry	<i>Ilex verticillata</i>	N, Shrub
<b>Sarsaparillas</b>	<b><i>Araliaceae</i></b>	
Wild Sarsaparilla	<i>Aralia nudicaulis</i>	N, Herb, New
Wild Ginseng	<i>Panax trifolius</i>	N, Herb, New
<b>Birthworts</b>	<b><i>Aristolochiaceae</i></b>	
Creeping Birthwort	<i>Aristolochia clematitis</i>	I, Herb, New
Canada Wild Ginger	<i>Asarum canadense</i>	N, Herb
<b>Composites (Asters/Daisies)</b>	<b><i>Asteraceae</i></b>	
Common Yarrow	<i>Achillea millefolium</i>	N, Herb
Common Ragweed	<i>Ambrosia artemisiifolia</i>	N, Herb
Field Pussytoes	<i>Antennaria neglecta</i>	N, Herb
Swamp Beggar Ticks	<i>Bidens connata</i>	N, Herb
Devil's Beggar Ticks	<i>Bidens frondosa</i>	N, Herb, New
Spotted Knapweed	<i>Centaurea stoebe</i>	Inv, Herb
Chicory	<i>Cichorium intybus</i>	I, Herb
Canada Thistle	<i>Cirsium arvense</i>	I, Herb
Cornel-leaved Aster	<i>Doellingeria infirma</i>	N, E, Herb, Hist
Tall Flat-topped White Aster	<i>Doellingeria umbellata</i>	N, Herb
Annual (Daisy) Fleabane	<i>Erigeron annuus</i>	N, Herb
Horseweed	<i>Erigeron canadensis</i>	N, Herb
Rough Fleabane	<i>Erigeron strigosus</i>	N, Herb
Rough Wood Aster	<i>Eurybia radula</i>	N, WL, Herb
Purple Wood Aster	<i>Eurybia spectabilis</i>	N, Herb
Flat-top (Grass-leaved) Goldenrod	<i>Euthamia graminifolia</i>	N, Herb
Atlantic Joe-Pye Weed	<i>Eutrochium dubium</i>	N, Herb
Spotted Joe-Pye Weed	<i>Eutrochium maculatum</i>	N, Herb
Woodland Sunflower	<i>Helianthus divaricatus</i>	N, Herb
Orange Hawkweed	<i>Hieracium aurantiacum</i>	I, Herb
Canada Hawkweed	<i>Hieracium canadense</i>	N, Herb, New

Meadow Hawkweed	<i>Hieracium caespitosum</i>	I, Herb
Mouse-ear Hawkweed	<i>Hieracium pilosella</i>	I, Herb
Yellow Lettuce	<i>Lactuca canadensis</i>	N, Herb
Oxeye-daisy	<i>Leucanthemum vulgare</i>	I, Herb
New England Blazing Star	<i>Liatris novae-angliae</i>	N, SC, Herb, Hist
Climbing Hempvine	<i>Mikania scandens</i>	N, Vine
Golden Ragwort	<i>Packera aurea</i>	N, Herb, New
Sweet Everlasting	<i>Pseudognaphalium obtusifolium</i>	N, Herb
Black-eyed Susan	<i>Rudbeckia hirta</i>	I, Herb
Fall Dandelion	<i>Scorzonoides autumnalis</i>	I, Herb
Canada Goldenrod	<i>Solidago canadensis</i>	N, Herb
Late Goldenrod	<i>Solidago gigantea</i>	N, Herb
Early Goldenrod	<i>Solidago juncea</i>	N, Herb
Gray (Field) Goldenrod	<i>Solidago nemoralis</i>	N, Herb
Downy Goldenrod	<i>Solidago puberula</i>	N, Herb
Rough-stemmed Goldenrod	<i>Solidago rugosa</i>	N, Herb, New
Bushy American Aster	<i>Symphyotrichum dumosum</i>	N, Herb
Lance-leaved American Aster	<i>Symphyotrichum lanceolatum</i>	N, Herb
Calico American Aster	<i>Symphyotrichum lateriflorum</i>	N, Herb
New England American Aster	<i>Symphyotrichum novae-angliae</i>	N, Herb
New York American Aster	<i>Symphyotrichum novi-belgii</i>	N, Herb
Purple-stemmed American Aster	<i>Symphyotrichum puniceum</i>	N, Herb
Small White American Aster	<i>Symphyotrichum racemosum</i>	N, Herb
Common Tansy	<i>Tanacetum vulgare</i>	I, Herb, New
Red-seeded Dandelion	<i>Taraxacum laevigatum</i>	I, Herb, New
Common Dandelion	<i>Taraxacum officinale</i>	I, Herb
Yellow Salsify	<i>Tragopogon dubius</i>	I, Herb, New
Yellow Goat's Beard	<i>Tragopogon pratensis</i>	I, Herb
Colt's Foot	<i>Tussilago farfara</i>	Inv, Herb, New
New York Ironweed	<i>Vernonia noveboracensis</i>	N, Herb
<b>Touch-me-nots (Jewelweeds)</b>	<b><i>Balsaminaceae</i></b>	
Orange Jewelweed	<i>Impatiens capensis</i>	N, Herb
<b>Barberries</b>	<b><i>Berberidaceae</i></b>	
Japanese Barberry	<i>Berberis thunbergii</i>	Inv, Shrub
European Barberry	<i>Berberis vulgaris</i>	Inv, Shrub
May Apple	<i>Podophyllum peltatum</i>	I, WL, Herb
<b>Birches &amp; Alders</b>	<b><i>Betulaceae</i></b>	
European Black Alder	<i>Alnus glutinosa</i>	I, Tree
Speckled Alder	<i>Alnus incana</i>	N, Shrub
Smooth Alder	<i>Alnus serrulata</i>	N, Shrub
Yellow Birch	<i>Betula alleghaniensis</i>	N, Tree
Black (Sweet) Birch	<i>Betula lenta</i>	N, Tree
River Birch	<i>Betula nigra</i>	N, WL, Tree, New
Paper Birch	<i>Betula papyrifera</i>	N, Tree
Gray Birch	<i>Betula populifolia</i>	N, Tree

Ironwood (American) Hornbeam	<i>Carpinus caroliniana</i>	N, Tree
American Hazelnut	<i>Corylus americana</i>	N, Tree
<b>Catalpas</b>		
Northern Catalpa	<i>Catalpa speciosa</i>	I, Tree, New
<b>Forget-me-nots</b>		
True Forget-me-not	<i>Myosotis scorpioides</i>	Inv, Herb
<b>Mustards</b>		
Garlic Mustard	<i>Alliaria petiolata</i>	Inv, Herb
Common Wintercress	<i>Barbarea vulgaris</i>	I, Herb
Hoary Alyssum	<i>Berteroa incana</i>	I, Herb
Shepherd's Purse	<i>Capsella bursa-pastoris</i>	I, Herb
Hairy Bittercress	<i>Cardamine hirsuta</i>	I, Herb, New
Narrow-leaved Bittercress	<i>Cardamine impatiens</i>	Inv, Herb, New
Common Whitlowgrass	<i>Draba verna</i>	I, Herb, New
Dame's Rocket	<i>Hesperis matronalis</i>	Inv, Herb, New
Cowcress	<i>Lepidium campestre</i>	I, Herb
Watercress	<i>Nasturtium officinale</i>	I, Herb
Charlock	<i>Sinapis arvensis</i>	I, Herb
Tower Mustard	<i>Turritis glabra</i>	N, Herb
<b>Bluebells</b>		
Cardinal Flower	<i>Lobelia cardinalis</i>	N, Herb
<b>Honeysuckles</b>		
Morrow's Honeysuckle	<i>Lonicera morrowii</i>	Inv, Shrub
Tatarian Honeysuckle	<i>Lonicera tatarica</i>	Inv, Shrub
<b>Pinks</b>		
Field Chickweed	<i>Cerastium arvense</i>	I, Herb
Mouse-ear Chickweed	<i>Cerastium fontanum</i>	I, Herb
Deptford Pink	<i>Dianthus armeria</i>	I, Herb, New
Ragged Robin	<i>Lychnis flos-cuculi</i>	I, Herb
Blunt-leaved Grove Sandwort	<i>Moehringia lateriflora</i>	N, Herb
Soapwort	<i>Saponaria officinalis</i>	I, Herb
German Knotgrass	<i>Scleranthus annuus</i>	I, Herb, New
White Campion	<i>Silene latifolia</i>	I, Herb, New
Red Sand Spurrey	<i>Spergularia rubra</i>	I, Herb
Common Stitchwort	<i>Stellaria graminea</i>	I, Herb
Common Chickweed	<i>Stellaria media</i>	I, Herb
<b>Bittersweets</b>		
Oriental (Asian) Bittersweet	<i>Celastrus orbiculatus</i>	Inv, Vine
Winged Euonymus (Burning Bush)	<i>Euonymus alatus</i>	Inv, Shrub
European Spindle Tree	<i>Euonymus europaea</i>	I, Shrub
Climbing Spindle Tree (Winter Creeper)	<i>Euonymus fortunei</i>	I, Shrub, New
<b>Hornworts</b>		
Coontail	<i>Ceratophyllum sp.</i>	N, Herb
<b>Pepperbushes</b>		
Sweet Pepper Bush	<i>Clethra alnifolia</i>	N, Shrub

**Morning Glories**

Hairy False Bindweed  
 Wild Morning Glory  
 Upright False Bindweed  
 Common Dodder

**Dogwoods**

Flowering Dogwood  
 Bunchberry  
 Black Gum (Tupelo)  
 Alternate-leaved Dogwood  
 Silky Dogwood  
 Gray Dogwood  
 Red Osier Dogwood

**Stonecrops**

Purple Orpine

**Gourds**

Wild Cucumber  
 Bur Cucumber

**Sundews**

Spatulate-leaved Sundew  
 Round-leaved Sundew

**Oleasters**

Autumn Olive

**Heaths**

Leatherleaf  
 Striped Pipsissewa  
 Pipsissewa  
 Trailing Arbutus (Mayflower)  
 Wintergreen  
 Black Huckleberry  
 Yellow Pinesap  
 Sheep Laurel  
 Mountain Laurel  
 Maleberry  
 Indian Pipe  
 American Shinleaf  
 Elliptic Shinleaf  
 Swamp-Azalea  
 Lowbush Blueberry  
 Highbush Blueberry  
 Black Highbush Blueberry  
 Large Cranberry  
 Small Cranberry  
 Hillside Blueberry

**Spurges**

Common Three-seeded Mercury  
 Spotted Spurge

**Convolvulaceae**

*Calystegia pubescens* I, Vine  
*Calystegia sepium* N, Vine  
*Calystegia spithamea* N, E, Herb  
*Cuscuta gronovii* N, Vine

**Cornaceae**

*Benthamidia florida* N, Tree  
*Chamaepericlymenum canadense* N, Herb  
*Nyssa sylvatica* N, Tree  
*Swida alternifolia* N, Shrub, New  
*Swida amomum* N, Shrub, New  
*Swida racemosa* N, Shrub  
*Swida sericea* N, Shrub

**Crassulaceae**

*Hylotelephium telephium* I, Herb

**Cucurbitaceae**

*Echinocystis lobata* N, Vine  
*Sicyos angulatus* N, Vine, New

**Droseraceae**

*Drosera intermedia* N, Herb  
*Drosera rotundifolia* N, Herb

**Elaeagnaceae**

*Eleagnus umbellata* Inv, Shrub

**Ericaceae**

*Chamaedaphne calyculata* N, Shrub  
*Chimaphila maculata* N, Herb  
*Chimaphila umbellata* N, Herb  
*Epigaea repens* N, Vine  
*Gaultheria procumbens* N, Herb  
*Gaylussacia baccata* N, Shrub  
*Hypopitys monotropa* N, Herb, New  
*Kalmia angustifolia* N, Shrub  
*Kalmia latifolia* N, Shrub  
*Lyonia ligustrina* N, Shrub  
*Monotropa uniflora* N, Herb  
*Pyrola americana* N, Herb, New  
*Pyrola elliptica* N, Herb  
*Rhododendron viscosum* N, Shrub  
*Vaccinium angustifolium* N, Shrub  
*Vaccinium corymbosum* N, Shrub  
*Vaccinium fuscum* N, Shrub  
*Vaccinium macrocarpon* N, Vine  
*Vaccinium oxycoccos* N, Vine  
*Vaccinium pallidum* N, Shrub

**Euphorbiaceae**

*Acalypha rhomboidea* N, Herb, New  
*Euphorbia maculata* N, Herb, New



**Peas**

Hog Peanut  
 American Groundnut  
 Yellow Wild Indigo  
 Honey Locust  
 Birdsfoot Trefoil  
 Blue Lupine  
 Yellow Sweet Clover  
 Black Locust  
 Purple Crown Vetch  
 Rabbit Foot Clover  
 Palmate Hop Clover  
 Red Clover  
 White Clover  
 Bird (Cow) Vetch  
 Narrow-leaved Vetch

**Beeches & Oaks**

American Chestnut  
 American Beech  
 European Beech  
 White Oak  
 Swamp White Oak  
 Scarlet Oak  
 Scrub Oak  
 Chestnut Oak  
 Pin Oak  
 English Oak  
 Red Oak  
 Black Oak

**Geraniums**

Wild Geranium  
 Herb Robert

**Currants**

Garden Red Currant

**Water Milfoils**

Eurasian Water Milfoil

**Witch Hazels**

American Witch Hazel

**St. John's Worts**

Orange Grass  
 Common St. John's Wort

**Walnuts & Hickories**

Bitternut Hickory  
 Pignut Hickory  
 Shagbark Hickory  
 Butternut  
 Eastern Black Walnut

**Fabaceae**

*Amphicarpaea bracteata* N, Herb  
*Apios americana* N, Herb  
*Baptisia tinctoria* N, Herb  
*Gleditsia triacanthos* I, Tree  
*Lotus corniculatus* I, Herb  
*Lupinus polyphyllus* I, Herb, New  
*Melilotus officinalis* I, Herb, New  
*Robinia pseudoacacia* Inv, Tree  
*Securigera varia* I, Herb, New  
*Trifolium arvense* I, Herb, New  
*Trifolium aureum* I, Herb  
*Trifolium pratense* I, Herb  
*Trifolium repens* I, Herb  
*Vicia cracca* I, Herb  
*Vicia sativa* I, Herb

**Fagaceae**

*Castanea dentata* N, Tree  
*Fagus grandifolia* N, Tree  
*Fagus sylvatica* I, Tree, New  
*Quercus alba* N, Tree  
*Quercus bicolor* N, Tree  
*Quercus coccinea* N, Tree  
*Quercus ilicifolia* N, Tree  
*Quercus montana* N, Tree  
*Quercus palustris* N, Tree  
*Quercus robur* I, Tree  
*Quercus rubra* N, Tree  
*Quercus velutina* N, Tree, New

**Geraniaceae**

*Geranium maculatum* N, Herb  
*Geranium robertianum* N, Herb

**Grossulariaceae**

*Ribes rubrum* I, Shrub

**Haloragaceae**

*Myriophyllum spicatum* Inv, Herb, New

**Hamamelidaceae**

*Hamamelis virginiana* N, Tree, New

**Hypericaceae**

*Hypericum gentianoides* N, Herb  
*Hypericum perforatum* I, Herb

**Juglandaceae**

*Carya cordiformis* N, Tree  
*Carya glabra* N, Tree  
*Carya ovata* N, Tree  
*Juglans cinerea* N, Tree  
*Juglans nigra* I, Tree, New

**Mints**

Carpet Bugle  
 Gill-over-the-Ground  
 Common Henbit  
 Red Henbit  
 Common Motherwort  
 American Water Horehound  
 Scarlet Bee Balm  
 Catnip  
 Common Selfheal  
 Marsh Skullcap  
 Side-flowering Skullcap  
 Blue Curls

**Laurels**

Northern Spicebush  
 Sassafras

**Loosestrifes**

Purple Loosestrife  
 Water Chestnut

**Mallows**

Velvetleaf  
 Swamp Rose Mallow

**Melastomas**

Northern Meadow Beauty

**Mulberries**

White Mulberry

**Wax Myrtles**

Sweet Fern  
 Northern Bayberry  
 Sweet Gale

**Marlberries**

Scarlet Pimpernel  
 Eastern Starflower  
 Fringed Loosestrife  
 Moneywort (Creeping Yellow Loosestrife)  
 Whorled Loosestrife  
 Swamp Candles

**Water Lilies**

Carolina Fanwort  
 Yellow Water Lily (Spatterdock)  
 American White (Fragrant) Water Lily  
 Tuberous Water Lily

**Olives, Ashes & Lilacs**

White Ash  
 Black Ash  
 Common Lilac

**Lamiaceae**

*Ajuga reptans* I, Herb, New  
*Glechoma hederacea* I, Herb  
*Lamium amplexicaule* I, Herb  
*Lamium purpureum* I, Herb, New  
*Leonurus cardiaca* I, Herb, New  
*Lycopus americanus* N, Herb  
*Monarda didyma* I, Herb, New  
*Nepeta cataria* I, Herb  
*Prunella vulgaris* N, Herb  
*Scutellaria galericulata* N, Herb  
*Scutellaria lateriflora* N, Herb, New  
*Trichostema dichotomum* N, Herb, New

**Lauraceae**

*Lindera benzoin* N, Shrub  
*Sassafras albidum* N, Shrub

**Lythraceae**

*Lythrum salicaria* Inv, Herb  
*Trapa natans* Inv, Herb, New

**Malvaceae**

*Abutilon theophrasti* I, Herb, New  
*Hibiscus moscheutos* N, Herb, New

**Melastomataceae**

*Rhexia virginica* N, Herb

**Moraceae**

*Morus alba* I, Tree

**Myricaceae**

*Comptonia peregrina* N, Shrub, New  
*Morella pennsylvanica* N, Shrub, New  
*Myrica gale* N, Shrub

**Myrsinaceae**

*Lysimachia arvensis* I, Herb, New  
*Lysimachia borealis* N, Herb  
*Lysimachia ciliata* N, Herb, New  
*Lysimachia nummularia* Inv, Vine, New  
*Lysimachia quadrifolia* N, Herb, New  
*Lysimachia terrestris* N, Herb, New

**Nymphaeaceae**

*Cabomba caroliniana* Inv, Herb, New  
*Nuphar variegata* N, Herb  
*Nymphaea odorata* N, Herb  
*Nymphaea tuberosa* I, Herb

**Oleaceae**

*Fraxinus americana* N, Tree  
*Fraxinus nigra* N, Tree  
*Syringa vulgaris* I, Shrub

**Evening Primroses**

Broad-leaf Enchanter's Nightshade  
 Common Water Primrose  
 Common Evening Primrose

**Broom-rapes**

Purple Painted Cup  
 Cow Wheat  
 One-flowered Broom-rape

**Wood Sorrels**

Common Wood Sorrel

**Poppies**

Greater Celandine Poppy  
 Squirrel Corn  
 Dutchman's Breeches  
 Wild Bleeding-heart  
 Bloodroot

**Lopseeds**

Allegheny Monkey Flower

**Pokeweeds**

American Pokeweed

**Plantains**

White Turtlehead  
 Butter and Eggs  
 Blue Toadflax  
 Bracted Plantain  
 Ribwort Plantain  
 Greater (Broad-leaf) Plantain  
 Corn-speedwell  
 Germander Speedwell  
 Heath (Common) Speedwell  
 Thyme-leaf Speedwell

**Plane Trees**

American Sycamore

**Milkworts**

Fringed Polygala  
 Field Milkwort

**Buckwheats**

Japanese Knotweed  
 Water Smartweed  
 Halberd-leaved Tearthumb  
 Carey's Smartweed  
 Dock-leaved Smartweed  
 Low (Chinese) Smartweed  
 Lady's Thumb  
 Arrow-leaved Tearthumb  
 Jumpseed

**Onagraceae**

*Circaea canadensis* N, Herb  
*Ludwigia palustris* N, Herb, New  
*Oenothera biennis* N, Herb

**Orobanchaceae**

*Castilleja exserta* I, Herb  
*Melampyrum lineare* N, Herb, New  
*Orobanche uniflora* N, Herb

**Oxalidaceae**

*Oxalis stricta* N, Herb

**Papaveraceae**

*Chelidonium majus* I, Herb  
*Dicentra canadensis* I, Herb  
*Dicentra cucullaria* N, Herb  
*Dicentra eximia* I, Herb, New  
*Sanguinaria canadensis* N, Herb

**Phrymaceae**

*Mimulus ringens* N, Herb, New

**Phytolaccaceae**

*Phytolacca americana* N, Herb

**Plantaginaceae**

*Chelone glabra* N, Herb  
*Linaria vulgaris* I, Herb  
*Nuttallanthus canadensis* N, Herb  
*Plantago aristata* I, Herb  
*Plantago lanceolata* I, Herb  
*Plantago major* I, Herb  
*Veronica arvensis* I, Herb  
*Veronica chamaedrys* I, Herb, New  
*Veronica officinalis* N, Herb  
*Veronica serpyllifolia* N, Herb

**Platanaceae**

*Platanus occidentalis* N, Tree, New

**Polygalaceae**

*Polygala paucifolia* N, Herb  
*Polygala sanguinea* N, Herb

**Polygonaceae**

*Fallopia japonica* Inv, Herb  
*Persicaria amphibia* N, Herb  
*Persicaria arifolia* N, Herb, New  
*Persicaria careyi* N, Herb  
*Persicaria lapathifolia* N, Herb  
*Persicaria longiseta* I, Herb  
*Persicaria maculosa* I, Herb  
*Persicaria sagittata* N, Herb  
*Persicaria virginiana* N, Herb

Sheep Sorrel	<i>Rumex acetosella</i>	I, Herb
Curly Dock	<i>Rumex crispus</i>	I, Herb
<b>Purslanes</b>	<b><i>Portulacaceae</i></b>	
Spring Beauty	<i>Claytonia sp.</i>	Herb
Common Purslane	<i>Portulaca oleracea</i>	I, Herb
<b>Buttercups</b>	<b><i>Ranunculaceae</i></b>	
Wild Baneberry (Doll's Eyes)	<i>Actaea pachypoda</i>	N, Herb
European Windflower	<i>Anemone nemorosa</i>	I, Herb, New
Wood Anemone	<i>Anemone quinquefolia</i>	N, Herb
Red Columbine	<i>Aquilegia canadensis</i>	N, Herb, New
Marsh Marigold	<i>Caltha palustris</i>	N, Herb
Virgin's Bower	<i>Clematis virginiana</i>	N, Vine
Three-leaved Goldthread	<i>Coptis trifolia</i>	N, Herb
Lesser Celandine (Fig Buttercup)	<i>Ficaria verna</i>	Inv, Herb, New
Tall Buttercup	<i>Ranunculus acris</i>	I, Herb, New
Bulbous Buttercup	<i>Ranunculus bulbosus</i>	I, Herb
Yellow Water Buttercup	<i>Ranunculus flabellaris</i>	N, Herb
Creeping Buttercup	<i>Ranunculus repens</i>	Inv, Herb
Cursed Crowfoot	<i>Ranunculus scleratus</i>	N, WL, Herb, New
Early Meadow Rue	<i>Thalictrum dioicum</i>	N, Herb
Tall Meadow Rue	<i>Thalictrum pubescens</i>	N, Herb
Rue Anemone	<i>Thalictrum thalictroides</i>	N, Herb, New
<b>Buckthorns</b>	<b><i>Rhamnaceae</i></b>	
Glossy Buckthorn	<i>Frangula alnus</i>	Inv, Shrub
Common Buckthorn	<i>Rhamnus cathartica</i>	Inv, Shrub
<b>Roses</b>	<b><i>Rosaceae</i></b>	
Downy Shadbush	<i>Amelanchier arborea</i>	N, Shrub/Tree
Smooth Shadbush	<i>Amelanchier laevis</i>	N, Shrub/Tree, New
Black Chokeberry	<i>Aronia melanocarpa</i>	N, Shrub
Hawthorn	<i>Crataegus sp.</i>	Shrub/Tree
Shrubby Cinquefoil	<i>Dasiphora floribunda</i>	N, Shrub
Wild Strawberry	<i>Fragaria virginiana</i>	N, Herb
White Avena	<i>Geum canadense</i>	N, Herb
Apple	<i>Malus sp.</i>	I, Shrub/Tree
Silvery Cinquefoil	<i>Potentilla argentea</i>	I, Herb
Dwarf Cinquefoil	<i>Potentilla canadensis</i>	N, Herb
Rough Cinquefoil	<i>Potentilla norvegica</i>	N, Herb
Rough-fruited Cinquefoil	<i>Potentilla recta</i>	I, Herb
Old Field Cinquefoil	<i>Potentilla simplex</i>	N, Herb
Sweet Cherry	<i>Prunus avium</i>	I, Tree
Fire (Pin) Cherry	<i>Prunus pensylvanica</i>	N, Shrub/Tree
Black Cherry	<i>Prunus serotina</i>	N, Tree
Choke Cherry	<i>Prunus virginiana</i>	N, Shrub/Tree
Pasture Rose	<i>Rosa carolina</i>	N, Shrub

Multiflora Rose	<i>Rosa multiflora</i>	Inv, Shrub
New England Rose	<i>Rosa nitida</i>	N, Shrub
Swamp rose	<i>Rosa palustris</i>	N, Shrub
Rugosa Rose	<i>Rosa rugosa</i>	I, Shrub
Common Blackberry	<i>Rubus allegheniensis</i>	N, Shrub
Northern Dewberry	<i>Rubus flagellaris</i>	N, Vine
Swamp Dewberry	<i>Rubus hispidus</i>	N, Vine
Red Raspberry	<i>Rubus idaeus</i>	N, Shrub
Black Raspberry	<i>Rubus occidentalis</i>	N, Shrub, New
European Mountain Ash	<i>Sorbus aucuparia</i>	I, Tree
White Meadowsweet	<i>Spiraea alba</i>	N, Shrub
Steeple-bush	<i>Spiraea tomentosa</i>	N, Shrub
<b>Madders</b>	<b><i>Rubiaceae</i></b>	
Buttonbush	<i>Cephalanthus occidentalis</i>	N, Shrub
Cleavers	<i>Galium aparine</i>	N, Herb
Hedge Bedstraw	<i>Galium mollugo</i>	I, Herb
Sweet Woodruff	<i>Galium odoratum</i>	I, Herb, New
Marsh Bedstraw	<i>Galium palustre</i>	N, Herb
Three-petaled Bedstraw	<i>Galium trifidum</i>	N, Herb
Bluets (Quaker Ladies)	<i>Houstonia caerulea</i>	N, Herb
Partridge Berry	<i>Mitchella repens</i>	N, Herb
<b>Rues</b>	<b><i>Rutaceae</i></b>	
Japanese (Amur) Cork Tree	<i>Phellodendron amurense</i>	Inv, Tree
<b>Willows &amp; Aspens</b>	<b><i>Salicaceae</i></b>	
Eastern Cottonwood	<i>Populus deltoides</i>	N, Tree, New
Big-toothed Aspen	<i>Populus grandidentata</i>	N, Tree
Quaking (Trembling) Aspen	<i>Populus tremuloides</i>	N, Tree
Gray Willow	<i>Salix cinerea</i>	Inv, Shrub, New
Large Pussy Willow	<i>Salix discolor</i>	N, Shrub
<b>Maples</b>	<b><i>Sapindaceae</i></b>	
Striped Maple	<i>Acer pensylvanicum</i>	N, Tree
Norway Maple	<i>Acer platanoides</i>	Inv, Tree
Red Maple	<i>Acer rubrum</i>	N, Tree
Silver Maple	<i>Acer saccharinum</i>	N, Tree
Sugar Maple	<i>Acer saccharum</i>	N, Tree
<b>Saxifrages</b>	<b><i>Saxifragaceae</i></b>	
Foamflower	<i>Tiarella cordifolia</i>	N, Herb
<b>Figworts</b>	<b><i>Scrophulariaceae</i></b>	
Moth-mullein	<i>Verbascum blattaria</i>	I, Herb
Common Mullein	<i>Verbascum thapsus</i>	I, Herb
<b>Ailanthuses</b>	<b><i>Simaroubaceae</i></b>	
Tree of Heaven	<i>Ailanthus altissima</i>	Inv, Tree
<b>Nightshades</b>	<b><i>Solanaceae</i></b>	
Jimsonweed (Thorn-apple)	<i>Datura stramonium</i>	I, Herb
Carolina Horse-nettle	<i>Solanum carolinense</i>	I, Herb, New
Bittersweet (Climbing) Nightshade	<i>Solanum dulcamara</i>	I, Vine

**Elms**

American Elm  
Slippery Elm

**Nettles**

False Nettle  
Canada Clearweed  
Stinging Nettle

**Vervains**

Blue Vervain  
Hoary Vervain  
White Vervain

**Viburnums**

Black Elderberry  
Mapleleaf Viburnum  
Smooth Arrowwood  
Hobblebush  
Nannyberry  
Wild Raisin

**Violets**

Britton's (Coast) Violet  
Lance-leaved Violet  
Smooth White Violet  
Bird's Foot Violet  
Arrowhead Violet  
Woolly Blue Violet  
Johnny Jump-up

**Grapes**

Porcelain Berry  
Virginia Creeper (Woodbine)  
Boston Ivy  
Fox (incl. Concord) Grape

**Ulmaceae**

*Ulmus americana* N, Tree  
*Ulmus rubra* N, Tree

**Urticaceae**

*Boehmeria cylindrica* N, Herb, New  
*Pilea pumila* N, Herb, New  
*Urtica dioica* N, Herb, New

**Verbenaceae**

*Verbena hastata* N, Herb, New  
*Verbena stricta* I, Herb  
*Verbena urticifolia* N, Herb, New

**Viburnaceae**

*Sambucus nigra* N, Shrub  
*Viburnum acerifolium* N, Shrub  
*Viburnum dentatum* N, Shrub  
*Viburnum lantanoides* N, Shrub, New  
*Viburnum lentago* N, Shrub  
*Viburnum nudum* N, Shrub

**Violaceae**

*Viola brittoniana* N, T, Herb  
*Viola lanceolata* N, Herb  
*Viola pallens* N, Herb  
*Viola pedata* N, Herb  
*Viola sagittata* N, Herb, New  
*Viola sororia* N, Herb, New  
*Viola tricolor* I, Herb, New

**Vitaceae**

*Ampelopsis heterophylla* Inv, Vine  
*Parthenocissus quinquefolia* N, Vine  
*Parthenocissus tricuspidata* I, Vine, New  
*Vitis labrusca* N, Vine

**VI. INVERTEBRATE ANIMALS (595)****VI A. Flatworms (2)****COMMON NAME**

A Flatworm

A Pick-axe Planarian

**Platyhelminthes****GENUS AND SPECIES**

*A Turbellaria*

**STATUS**

New

**Geoplanidae**

*Bipalium sp.*

New

**VI B. Nematodes (1)****COMMON NAME**

A Nematode

**Nematoda****GENUS AND SPECIES**

*A Nematoda*

**STATUS**

New



**VI C. Tardigrades (1)****COMMON NAME**

A Water Bear

**Tardigrada****GENUS AND SPECIES****STATUS****Macrobiotidae***Macrobiotus sp.*

New

**VI D. Segmented Worms (2)****COMMON NAME**

An Earthworm

A Snake Earthworm

**Annelida****GENUS AND SPECIES****STATUS****Lumbricidae***A Lumbricidae*

New

**Megascolecidae***Amyntas sp.*

New

**VI E. Moss Animals (1)****COMMON NAME**

Magnificent Bryozoan

**Bryozoa****GENUS AND SPECIES****STATUS****Pectinatellidae***Pectinatella magnifica*

New

**VI F. Mollusks (8)****COMMON NAME****VI F 1. Bivalves****Fingernail Clams**

A Fingernail Clam

**River Mussels**

Eastern Floater Mussel

**VI F 2. Gastropods****Keelback Slugs**

Leopard Slug

A Gloss Snail

**Ram's Horn Snails**

Marah Ram's Horn

**Amber Snails**

Common European Amber Snail

**Mystery Snails**

Chinese Mystery Snail

White-lipped Snail

**Mollusca****GENUS AND SPECIES****STATUS****Bivalva****Sphaeriidae***A Sphaeriidae*

New

**Unionidae***Pyganodon cataracta*

New

**Gastropoda****Limacidae***Limax maximus*

New

**Gastrodontidae***Zonitoides sp.*

New

**Planorbidae***Planorbella trivolis*

New

**Succineidae***Succinea putris*

New

**Viviparidae***Cipangopaludina chinensis*

New

*Neohelix albolibris***VI G. Crustaceans (7)****COMMON NAME****VI G 1. Branchiopods (1)**

Fairy Shrimp

**VI G 2. Decapods (1)**

Crayfish

**VI G 3. Isopods & Pillbugs (4)**

Nosy Pill Woodlouse

Common Pill Woodlouse

**Arthropoda: Crustacea****GENUS AND SPECIES****STATUS****Branchiopoda***Eubrachippus vernalis*

N

**Decapoda***Cambarus bartoni*

N

**Isopoda***Armadillidium nasatum*

I, New

*Armadillidium vulgare*

I, New

Common Shiny Woodlouse  
Common Rough Woodlouse  
**VI G 4. Millipedes & Centipedes (1)**  
A Millipede

## **VI H. Arachnids (29)**

### **COMMON NAME**

### **VI H 1. Mites & Ticks (4)**

#### **Eriophyid Mites**

Black Cherry Leaf Gall Mite

#### **Hard-backed Ticks**

American Dog Tick

Deer Tick

#### **Parasitic Mites**

A Parasitic Mite

### **VI H 2. Spiders (24)**

#### **Grass Spiders**

Funnel Web Grass Spider

#### **Hacklemesh Weavers**

Hacklemesh Weaver

#### **Orb-weaver Spiders**

Black and Yellow Garden Spider

Banded Garden Spider

Spined Orb-weaver

#### **Gnaphosid Spiders**

Eastern Parson Spider

Variegated Ground Spider

#### **Wolf Spiders**

Broad-banded Wolf Spider

Rabid Wolf Spider

A Wolf Spider

#### **Pirate Spiders**

A Pirate Spider

#### **Daddy Long-legs Spiders**

Daddy Long-legs

#### **Nursery Web Spiders**

Six-spotted Fishing Spider

Nursery Web Spider

#### **Jumping Spiders**

A small Jumping Spider

White-jawed Jumping Spider

Dimorphic Jumping Spider

Flea Jumping Spider

Bold Jumping Spider

Tan Jumping Spider

#### **Tetragnathid Spiders**

Orchard Orbweaver

*Oniscus asellus*

I, New

*Porcellio scaber*

I, New

### **Myriopoda**

*A Diplopoda*

New

## **Arthropoda: Arachnida**

### **GENUS AND SPECIES**

### **STATUS**

#### **Acari**

#### **Eriophyidae**

*Eriophyes cerasicrumena*

N, New

#### **Ixodidae**

*Dermacenter variabilis*

N

*Ixodes dammini*

N

#### **Parasitidae**

*Poecilochirus sp.*

N

#### **Araneae**

#### **Agelenidae**

*Agelenopsis pennsylvania*

N, New

#### **Amaurobiidae**

*Callobius bennetti*

N, New

#### **Araneidae**

*Argiope aurantia*

N

*Argiope trifasciata*

N, New

*Micrathena gracilis*

N, New

#### **Gnaphosidae**

*Herpyllus ecclesiasticus*

N, New

*Sergiolus capulatus*

N, New

#### **Lycosidae**

*Hogna frondicola*

N, New

*Rabidosa rabida*

N, New

*A Lycosidae*

N, New

#### **Mimetidae**

*Mimetus puritanus*

N, New

#### **Phocidae**

*Caddo agilis*

N

#### **Pisauridae**

*Dolomedes triton*

N, New

*Pisaurina mira*

N, New

#### **Salticidae**

*Habronattus decorus*

N, New

*Hentzia mitrata*

N, New

*Maevia inclemens*

N, New

*Naphrys pulex*

N, New

*Phidippus audax*

N

*Platycryptus undatus*

N, New

#### **Tetragnathidae**

*Leucauge venusta*

N, New

**Cobweb Spiders**

Boreal Combfoot

**Ambush Crab Spiders**

Goldenrod Crab Spider

**Hackled Orb Weavers**

Feather-legged Orb Weaver

**VI H 3. Psuedoscorpions (1)**

A Pseudoscorpion

**VI I. Insects (544)****COMMON NAME****VI I 1. Cockroaches & Termites (1)**

Tawny Cockroach

**VI I 2. Beetles (71)****Bostrichid Beetles**

Larder Beetle

**Soldier Beetles**

Goldenrod Soldier Beetle

Wrinkled Soldier Beetle

**Ground & Tiger Beetles**

Bronze Ground Beetle

Twelve-spotted Tiger Beetle

Bronzed Tiger Beetle

Six-spotted Tiger Beetle

Snail-eating Beetle

**Long-horned Beetles**

A Flower Long-horned Beetle

A Flower Long-horned Beetle

A Flower Long-horned Beetle

Graphisurus Beetle

A Flower Long-horned Beetle

Locust Longhorn Borer

Northeastern Pine Sawyer

White-spotted Sawyer Beetle

A Typical Longhorn Beetle

Brown Prionid Beetle

Broad-necked Root Borer

Purplulent Longhorn

Strangalepta Flower Longhorn Beetle

Slender Flower Longhorn Beetle

Yellow-horned Flower Longhorn Beetle

Red Milkweed Beetle

A Flower Long-horned Beetle

Banded Longhorn Beetle

**Theridiidae***Steatoda borealis*

N, New

**Thomasidae***Misumena vatia*

N, New

**Uloboridae***Uloborus glomosus*

N, New

**Pseudoscorpiones***A Pseudoscorpiones*

N, New

**Insecta****GENUS AND SPECIES****STATUS****Blattodea****Ectobiidae***Ectobius pallidus*

New

**Coleoptera****Bostrichidae***Dermestes lardarius***Cantharidae***Chauliognathus pensylvanicus**Podabrus rugosulus*

New

**Carabidae***Carabus nemoralis*

New

*Cicindela duodecimguttata*

SC, New

*Cicindela repanda*

New

*Cicindela sexguttata**Sphaeroderus stenostomus***Cerambycidae***Analeptura lineola*

New

*Anthophylax cyaneus**Etorofus subhamatus*

New

*Graphisurus fasciatus**Judolia cordifera*

New

*Megacyllene robiniae**Monochamus notatus**Monochamus scutellatus*

New

*Obrium rufulum*

New

*Orthosoma brunneum*

New

*Prionus laticollis**Purpuricenus humeralis*

New

*Strangalepta abbreviata*

New

*Strangalia famelica*

New

*Strangalia luteicornis*

New

*Tetraopes tetrophthalmus**Typocerus acuticauda*

New

*Typocerus velutinus*

New

**Leaf Beetles**

Dogbane Beetle  
 A Leaf-eating Beetle  
 Clavate Tortoise Beetle  
 Black-margined Loosetrife Beetle  
 Swamp Milkweed Beetle  
 Colorado Potato Beetle  
 Lily Leaf Beetle  
 Ragweed Leaf Beetle

**Lady Beetles (Lady Bugs)**

Two-spotted Lady Beetle  
 Eye-spotted Lady Beetle  
 Seven-spotted Lady Beetle  
 Spotted Lady Beetle  
 Handsome Fungus Beetle  
 Asian Lady Beetle  
 Convergent Lady Beetle

**Reticulated Beetles**

A Reticulated Beetle

**Weevils & Snout Beetles**

An Odontocorynus Weevil  
 Green Immigrant Leaf Weevil  
 Two-banded Japanese Weevil  
 Billbug

**Predacious Diving Beetles**

A Small Flat Diving Beetle  
 A Small Flat Diving Beetle  
 Understriped Diving Beetle

**Click Beetles**

Eastern Eyed Click Beetle  
 A Click Beetle

**Firefly Beetles**

Winter Firefly

**Stag Beetles**

Antelope Beetle  
 Pinching Beetle

**Net-winged Beetles**

Banded Net-winged Beetle  
 End Band Net-winged Beetle

**Blister Beetles**

A Blister Beetle

**Sap Beetles**

Sap-feeding Beetle

**Scarab Beetles**

Oriental Beetle  
 Goldsmith Beetle  
 Common Green June Beetle

**Chrysomelidae**

*Chrysochus auratus*  
*Chrysolina sp.*  
*Deloyala clavata* New  
*Galerucella californiensis* New  
*Labidomera clivicollis*  
*Leptinotarsa decemlineata* New  
*Lilioceris lili*  
*Zygogramma suturalis*

**Coccinellidae**

*Adalia bipunctata*  
*Anatis mali*  
*Coccinella septempunctata* New  
*Coleomegilla maculata*  
*Endomychus biguttatus*  
*Harmonia axyridis*  
*Hippodamia convergens*

**Cupedidae**

*Cupes capitatus* New

**Curculionidae**

*Odontocorynus sp.*  
*Polydrusus formosus* New  
*Pseudocneorhinus bifasciatus* New  
*Sphenophorus australis*

**Dytiscidae**

*Acilius semisulcatus* New  
*Acilius sylvanus* New  
*Dytiscus fasciventris* New

**Elateridae**

*Alaus oculatus*  
*Ampedus linteus* New

**Lampyridae**

*Ellychnia corrusca*

**Lucanidae**

*Dorcus parallelus*  
*Lucanus capreolus*

**Lycidae**

*Calopteron reticulatum*  
*Calopteron terminale*

**Meloidae**

*Meloe sp.*

**Nitidulidae**

*Glischrochilus fasciatus*

**Scarabaeidae**

*Anomala orientalis*  
*Cotalpa lanigera*  
*Cotinis nitida*

Bumble Flower Beetle  
 Oriental Beetle  
 Scarab Beetle  
 Japanese Beetle  
**Burying & Carrion Beetles**  
 American Carrion Beetle  
 Margined Burying Beetle  
 Roundneck Sexton Beetle  
 Burying Beetle  
**Darkling Beetles**  
 Forked Fungus Beetle  
 A Wedge-shaped Beetle  
**VI I 3. Springtails (1)**  
 A Springtail  
**VI I 4. Earwigs (1)**  
**Earwigs**  
 European Earwig  
**VI I 5. Flies (35)**  
**Robber Flies**  
 A Robber Fly  
 A Robber Fly  
 A Bee-Mimic Robber Fly  
 A Bee-Mimic Robber Fly  
 A Robber Fly  
**March Flies & Lovebugs**  
 March Fly  
**Bee Flies & Humbleflies**  
 Tiger Bee Fly  
**Blow Flies**  
 Blue Bottle Fly  
 Cluster Fly  
**Gall Midges**  
 Ocellate Gall Midge  
**Phantom Midges**  
 Phantom Midge larva  
**Thick-headed Flies**  
 A Thick-headed Fly  
 Common Eastern Physocephala  
 A Thick-headed Fly  
**Mosquitoes**  
 Mosquitoes  
**Pomace Flies**  
 A Fruit Fly  
**Limoniid Crane Flies**  
 A Crane Fly  
**House Flies**  
 A House Fly

*Euphoria inda*  
*Exomala orientalis*  
*Osmoderma scabra*  
*Popillia japonica*  
**Silphidae**  
*Necrophila americana*  
*Nicrophorus marginatus*  
*Nicrophorus orbicollis*  
*Nicrophorus tomentosus*  
**Tenebrionidae**  
*Bolitotherus cornutus*  
*Macrosiagon limbata*  
**Collembola**  
*A Collembola*  
**Dermaptera**  
**Forficulidae**  
*Forficula auricularia*  
**Diptera**  
**Asilidae**  
*Dioctria hyalipennis* New  
*Efferia aestuans* New  
*Laphria grossa* New  
*Laphria posticata* New  
*Machimus notatus* New  
**Bibionidae**  
*Bibio femoratus*  
**Bombyliidae**  
*Xenox tigrinus* New  
**Calliphoridae**  
*Calliphora vomitoria*  
*Pollenia sp.*  
**Cecidomyiidae**  
*Acericecis ocellaris* New  
**Chaoboridae**  
*Chaoborus sp.*  
**Conopidae**  
*Myopa sp.*  
*Physocephala tibialis* New  
*Stylogaster neglecta* New  
**Culicidae**  
*Culicidae spp.*  
**Drosophilidae**  
*Drosophila sp.*  
**Limoniidae**  
*Limonia annulata* New  
**Muscidae**  
*A Muscidae*

**Phantom Crane Flies**

Eastern Phantom Crane Fly

**Black Flies**

A Black Fly

**Soldier Flies**

A Soldier Fly

**Hoverflies**

Orange-spotted Drone Fly

European Drone Fly

Transverse-banded Flower Fly

Narcissus Bulb Fly

Eastern Hornet Fly

Eastern Calligrapher

Margined Calligrapher

**Deer & Horse Flies**

Deer Fly

American Horse Fly

**Bristle Flies**

Early Tachinid Fly

A Tachinine Fly

Feather-legged Fly

Swift Feather-legged Fly

**Large Crane Flies**

A Large Crane Fly

**VI | 6. True Bugs (39)****Conifer Adelgids**

Hemlock Woolly Adelgid

**Broad-headed Bugs**

Broad-headed Bug

**Aphids**

Oleander Aphid

Elm Cockscomb Aphid

Witch-hazel Cone Gall Aphid

**Giant Water Bugs**

American Giant Water Bug

**Leafhoppers**

A Typical Leafhopper

Red-banded Leafhopper

Rhododendron Leafhopper

Coppery Leafhopper

Speckled Sharpshooter

**Cicadas**

Lyric Cicada

**Other Spittlebugs**

Dogwood Spittlebug

**Leaf-footed Bugs**

Leaf-footed Bug

**Ptychopteridae***Bittacomorpha clavipes*

New

**Simuliidae***Simulium sp.***Stratiomyidae***Odontomyia cincta*

New

**Syrphidae***Eristalis anthophorina*

New

*Eristalis arbustorum*

New

*Eristalis transversa*

New

*Merodon equestris*

New

*Spilomyia longicornis*

New

*Toxomerus geminatus*

New

*Toxomerus marginatus*

New

**Tabanidae***Chrysops callidus**Tabanus americanus***Tachinidae***Epalpus signifer*

New

*Juriniopsis adusta*

New

*Trichopoda lanipes*

New

*Trichopoda pennipes*

New

**Tipulidae***Tipula furca*

New

**Hemiptera/Homoptera****Adelgidae***Adelges tsugae*

PD, New

**Alydidae***Alydus eurinus*

New

**Aphididae***Aphis nerii*

New

*Colopha ulmicola*

New

*Hormaphis hamamelidis*

New

**Belostomatidae***Lethocerus americanus***Cicadellidae***Empoa venusta*

New

*Graphocephala coccinea**Graphocephala fennahi*

New

*Jikradia olitoria*

New

*Paraulacizes irrorata*

New

**Cicadidae***Tibicen lyricen***Clastopteridae***Clastoptera proteus*

New

**Coreidae***Acanthocephala terminalis*

New

Squash Bug	<i>Anasa tristis</i>	New
Helmeted Squash Bug	<i>Euthochtha galeator</i>	New
Western Conifer Seed Bug	<i>Leptoglossus occidentalis</i>	
A Leaf-footed Bug	<i>Leptoglossus zonatus</i>	New
<b>Flatid Planthoppers</b>	<b>Flatidae</b>	
Citrus Flatid Planthopper	<i>Metcalfa pruinosa</i>	New
<b>Water Striders</b>	<b>Gerridae</b>	
Common Water Strider	<i>Aquarius remigis</i>	
<b>Seed (Milkweed) Bugs</b>	<b>Lygaeidae</b>	
Small Milkweed Bug	<i>Lygaeus kalmii</i>	New
Eastern Small Milkweed Bug	<i>Lygaeus kalmii angustomarginatus</i>	New
False Milkweed Bug	<i>Lygaeus turcicus</i>	New
<b>Treehoppers</b>	<b>Membracidae</b>	
A Buffalo Treehopper	<i>Ceresa sp.</i>	
Keeled Treehopper	<i>Entylia carinata</i>	
<b>Plant Bugs</b>	<b>Miridae</b>	
Tarnished Plant Bug	<i>Lygus lineolaris</i>	New
<b>Waterscorpions</b>	<b>Nepidae</b>	
Brown Waterscorpion	<i>Ranatra fusca</i>	New
<b>Backswimmers</b>	<b>Notonectidae</b>	
Back-swimmer	<i>Notonecta irrorata</i>	New
<b>Stink &amp; Shield Bugs</b>	<b>Pentatomidae</b>	
Rough Stink Bug	<i>Brochymena arborea</i>	New
Green Stink Bug	<i>Chinavia hilaris</i>	New
Twice-stabbed Stink Bug	<i>Cosmopepla lintneriana</i>	New
Brown Stink Bug	<i>Euschistus servus</i>	New
Brown Marmorated Stink Bug	<i>Halyomorpha halys</i>	New
Predaceous Stink Bug	<i>Stiretrus anchorago</i>	
<b>Assassin Bugs</b>	<b>Reduviidae</b>	
Thread-legged Bug	<i>Emesaya brevipennis</i>	
Pennsylvania Ambush Bug	<i>Phymata pennsylvanica</i>	New
Ringed Assassin Bug	<i>Pselliopus cinctus</i>	New
Pale Green Assassin Bug	<i>Zelus luridus</i>	New
<b>Scentless Plant Bugs</b>	<b>Rhopalidae</b>	
Eastern Boxelder Bug	<i>Boisea trivittata</i>	New
<b>VI   7. Social Insects (50)</b>	<b>Hymenoptera</b>	
<b>Mining Bees</b>	<b>Andrenidae</b>	
Wilke's Mining Bee	<i>Andrena wilkella</i>	New
<b>Typical Bees</b>	<b>Apidae</b>	
Orange-tipped Wood-digger Bee	<i>Anthophora terminalis</i>	New
Western Honey Bee	<i>Apis mellifera</i>	
Two-spotted Bumble Bee	<i>Bombus bimaculatus</i>	New
Golden Northern Bumble Bee	<i>Bombus fervidus</i>	AP, New
Common Eastern Bumble Bee	<i>Bombus impatiens</i>	New
American Bumble Bee	<i>Bombus pensylvanicus</i>	E
Eastern Carpenter Bee	<i>Xylocopa virginica</i>	



**Argid Sawflies**

Poison Ivy Sawfly

**Yellow-faced Bees**

Unequal Cellophane Bee

**Digger Wasps**

Beetle-hunting Wasp

Cicada-killer Wasp

Eastern Cicada-killer Wasp

**Gall Wasps**

Larger Empty Oak Apple Wasp

Acorn Plum Gall Wasp

Oak Petiole Gall Wasp

Wool Sower Gall Wasp

Blackberry Seed Gall Wasp

Mossy Rose Gall Wasp

Round Bullet Gall Wasp

Oak Rough Bulletgall Wasp

Succulent Oak Gall Wasp

An Oak Gall Wasp

**Conifer Sawflies**

Red-headed Pine Sawfly

**Potter & Mason Wasps**

European Paper Wasp

Northern Paper Wasp

**Ants**

Eastern Black Carpenter Ant

Little Black Ant

**Sweat Bees**

Bicolored Striped Sweat Bee

A Sweat Bee

**Ichneumon Wasps**

Giant Ichneumon Wasp

**Leaf-cutting Bees**

European Wool-carder Bee

Bellflower Resin Bee

**Velvet Ants**

Eastern Velvet Ant

A Nocturnal Velvet Ant

**Spider Wasps**

A Blue-black Spider Wasp

**Thread-waisted Wasps**

Thread-waisted Wasp

Grass-carrier Wasp

Great Golden Digger Wasp

Great Black Digger Wasp

**Hornets & Yellowjackets**

Waldenii Potter Wasp

**Argidae***Arge humeralis***Colletidae***Colletes inaequalis***Crabronidae***Cerceris fumipennis**Sphecius sp.**Sphecius speciosus*

New

**Cynipidae***Amphibolips quercusinanis*

New

*Amphibolips quercusjuglans*

New

*Andricus quercuspetiolicola*

New

*Callirhytis seminator*

New

*Diastrophus cuscuteaeformis*

New

*Diplolepis rosae*

New

*Disholcaspis quercusglobulus*

New

*Disholcaspis quercusmamma*

New

*Dryocosmus quercuspalustris*

New

*Neuroterus tantulus*

New

**Diprionidae***Neodiprion lecontei*

New

**Eumenidae***Polistes dominulus**Polistes fuscatus***Formicidae***Camponotus pennsylvanicus**Monomorium minimum***Halictidae***Agapostemon virescens*

New

*Lasioglossum sp.*

New

**Ichneumonidae***Megarhyssa atrata***Megachilidae***Anthidium manicatum**Megachile campanulae*

New

**Mutillidae***Dasymutilla occidentalis**Dasymutilla vesta*

New

**Pompilidae***Anoplius americanus*

New

**Sphecidae***Ammophila sp.**Isodontia sp.**Sphex ichneumoneus*

New

*Sphex pensylvanicus*

New

**Vespidae***Ancistrocerus waldenii*

New

Common Aerial Yellowjacket	<i>Dolichovespula arenaria</i>	New
Bald-faced Hornet	<i>Dolichovespula maculata</i>	
A Potter wasp	<i>Eumenes sp.</i>	
A Potter Wasp	<i>Euodynerus hidalgo</i>	New
Four-toothed Mason Wasp	<i>Monobia quadridens</i>	New
Dark Paper Wasp	<i>Polistes fuscatus</i>	New
German Yellowjacket	<i>Vespula germanica</i>	New
Eastern Yellowjacket	<i>Vespula maculifrons</i>	
Widow Yellowjacket	<i>Vespula vidua</i>	New
<b>VI I 8. Butterflies &amp; Skippers (58)</b>	<b>Lepidoptera 1</b>	
<b>Skippers</b>	<b>Hesperiidae</b>	
Hoary Edge	<i>Achalarus lyciades</i>	
Least Skipper	<i>Ancyloxypha numitor</i>	
Dusted Skipper	<i>Atrytonopsis hianna</i>	
Silver-spotted Skipper	<i>Epargyreus clarus</i>	
Wild Indigo Duskywing	<i>Erynnis baptisiae</i>	New
Horace's Duskywing	<i>Erynnis horatius</i>	New
Juvenal's Duskywing	<i>Erynnis juvenalis</i>	
Dun Skipper	<i>Euphytes vestris</i>	
Common Sootywing	<i>Pholisora catullus</i>	
Mulberry Wing	<i>Poanes massasoit</i>	New
Broad-winged Skipper	<i>Poanes viator</i>	
Zabulon Skipper	<i>Poanes zabulon</i>	New
Long Dash	<i>Polites mystic</i>	
Crossline Skipper	<i>Polites origenes</i>	New
Peck's Skipper	<i>Polites peckius</i>	
Tawny-edged Skipper	<i>Polites themistocles</i>	
Little Glassywing	<i>Pompeius verna</i>	
Northern Cloudywing	<i>Thorybes pylades</i>	
European Skipper	<i>Thymelicus lineola</i>	
Northern Broken Dash	<i>Wallengrenia egeremet</i>	New
<b>Gossamer-Wings</b>	<b>Lycaenidae</b>	
Eastern Pine Elfin	<i>Callophrys niphon</i>	
Spring Azure	<i>Celastrina ladon</i>	
Eastern Tailed Blue	<i>Cupido comyntas</i>	
Bronze Copper	<i>Lycaena hyllus</i>	
American Copper	<i>Lycaena phlaeas</i>	
White M Hairstreak	<i>Parrhasius m-album</i>	
Banded Hairstreak	<i>Satyrium calanus</i>	
Striped Hairstreak	<i>Satyrium liparops</i>	New
<b>Brushfoots</b>	<b>Nymphalidae</b>	
Silver-bordered Fritillary	<i>Boloria selene</i>	
Common Wood-Nymph	<i>Cercyonis pegala</i>	
Common Ringlet	<i>Coenympha tullia</i>	
Monarch	<i>Danaus plexippus</i>	
Baltimore Checkerspot	<i>Euphydryas phaeton</i>	
Variegated Fritillary	<i>Euptoieta claudia</i>	

Common Buckeye	<i>Junonia coenia</i>	
Northern Pearly Eye	<i>Lethe anthedon</i>	
Appalachian Brown	<i>Lethe appalachia</i>	
Eyed Brown	<i>Lethe eurydice</i>	
Viceroy	<i>Limenitis archippus</i>	New
White Admiral	<i>Limenitis arthemis arthemis</i>	
Red Spotted Purple	<i>Limenitis arthemis astyanax</i>	
Little Wood-Satyr	<i>Megisto cymela</i>	
Mourning Cloak	<i>Nymphalis antiopa</i>	
Compton Tortoiseshell	<i>Nymphalis vau-album</i>	
Pearl Crescent	<i>Phyciodes tharos</i>	
Eastern Comma	<i>Polygonia comma</i>	
Question Mark	<i>Polygonia interrogationis</i>	
Great Spangled Fritillary	<i>Speyeria cybele</i>	
Red Admiral	<i>Vanessa atalanta</i>	
Painted Lady	<i>Vanessa cardui</i>	
American Lady	<i>Vanessa virginiensis</i>	
<b>Swallowtails</b>	<b><i>Papilionidae</i></b>	
Giant Swallowtail	<i>Papilio cresphontes</i>	New
Eastern Tiger Swallowtail	<i>Papilio glaucus</i>	
Black Swallowtail	<i>Papilio polyxenes</i>	
Spicebush Swallowtail	<i>Papilio troilus</i>	
<b>Whites &amp; Sulphurs</b>	<b><i>Pieridae</i></b>	
Orange Sulphur	<i>Colias eurytheme</i>	
Clouded Sulphur	<i>Colias philodice</i>	
Cabbage White	<i>Pieris rapae</i>	
<b>VI 19. Moths (178)</b>	<b><i>Lepidoptera 2</i></b>	
<b>Grass Tubeworm Moths</b>	<b><i>Acrolophidae</i></b>	
Clemens Grass Tubeworm Moth	<i>Acrolophus popeanella</i>	
<b>Grass Moths</b>	<b><i>Crambidae</i></b>	
Small Magpie Moth	<i>Anania hortulata</i>	
Milky Urola Moth	<i>Argyria lacteella</i>	
Sooty-winged Chalcoela Moth	<i>Chalcoela iphitalis</i>	
Grape Leaf Folder Moth	<i>Desmia funeralis</i>	
Darker Diacme Moth	<i>Diacme adipaloides</i>	
Harlequin Webworm Moth	<i>Diathrausta harlequinialis</i>	
Recondite Webworm Moth	<i>Diathrausta reconditalis</i>	
Julias Dicymolomia Moth	<i>Dicymolomia julianalis</i>	
Pondside Pyralid Moth	<i>Elophila icciusalis</i>	
Purple-backed Cabbageworm	<i>Evergestis pallidata</i>	
Elegant Grass-veneer Moth	<i>Microcrambus elegans</i>	
Lucerne Moth	<i>Nomophila nearctica</i>	
Titian Peales Pyralid Moth	<i>Perispasta caeculalis</i>	
Mint-loving Pyrausta Moth	<i>Pyrausta acrionalis</i>	New
Bicolored Pyrausta Moth	<i>Pyrausta bicoloralis</i>	
Many-spotted Scoparia Moth	<i>Scoparia basalis</i>	
Carrot Seed Moth	<i>Sitochroa palealis</i>	New

Celery Leaf-tier Moth	<i>Udea rubigalis</i>	
Snowy Urola Moth	<i>Urola nivalis</i>	New
Straight-lined Argyria Moth	<i>Vaxi critica</i>	
<b>Flat-bodied Moths</b>	<b><i>Depressariidae</i></b>	
Pale Gray Bird-dropping Moth	<i>Antaeotricha leucillana</i>	
<b>Hook-tip Moths</b>	<b><i>Drepanidae</i></b>	
Arched Hook-tip Moth	<i>Drepana arcuata</i>	
<b>Elachistid Moths</b>	<b><i>Elachistidae</i></b>	
Gold-striped Leaf-tier Moth	<i>Machimia tentoriferella</i>	New
<b>Tiger &amp; Owlet Moths</b>	<b><i>Erebidae</i></b>	
Virgin Tiger Moth	<i>Apantesis virgo</i>	New
Epione Underwing	<i>Catocala epione</i>	
Ultonia Underwing	<i>Catocala ultonia</i>	New
Yellow-collared Scape Moth	<i>Cisesept fulvicollis</i>	
Black-dotted Brown	<i>Cissusa spadix</i>	
Little White Lichen Moth	<i>Clemensia albata</i>	
Milkweed Tussock Moth	<i>Euchaetes egle</i>	
Banded Tussock Moth	<i>Halysidota tessellaris</i>	
Clymene Moth	<i>Haploa clymene</i>	
Leconte's Haploa	<i>Haploa lecontei</i>	
Baltimore Bomolocha	<i>Hypena baltimoralis</i>	
Dimorphic Bomolocha	<i>Hypena bijugalis</i>	
Green Cloverworm Moth	<i>Hypena scabra</i>	
Giant Leopard Moth	<i>Hypercompe scribonia</i>	
Painted Lichen Moth	<i>Hypoprepia fucosa</i>	
Common Idia	<i>Idia aemula</i>	
American Idia	<i>Idia americalis</i>	
Orange-spotted Idia	<i>Idia diminuendis</i>	
Julias Idia	<i>Idia julia</i>	
Rotund Idia	<i>Idia rotundalis</i>	
Ambiguous Moth	<i>Lascoria ambigualis</i>	
Gypsy Moth	<i>Lymantria dispar</i>	PD
White-marked Tussock Moth	<i>Orgyia leucostigma</i>	New
Dark-spotted Palthis	<i>Palthis angulalis</i>	
Faint-spotted Palthis	<i>Palthis asopialis</i>	
Maple Looper Moth	<i>Parallelia bistriaris</i>	New
Common Oak Moth	<i>Phoberia atomaris</i>	New
Woolly Bear	<i>Pyrrharctia isabella</i>	
White-spotted Redectis Moth	<i>Redectis vitrea</i>	
Discolored Renia Moth	<i>Renia discoloralis</i>	New
Yellow-spotted Renia Moth	<i>Renia flavipunctalis</i>	
Joyful Holomelina	<i>Virbia laeta</i>	
Lunate Zale	<i>Zale lunata</i>	
Wavy-lined Zanclognatha	<i>Zanclognatha jacchusalis</i>	New
Variable Zanclognatha Moth	<i>Zanclognatha laevigata</i>	

**Geometrid Moths**

Oak Besma  
 Pale Beauty  
 Northern Pine Looper Moth  
 Barberry Geometer  
 Bent-line Carpet  
 Sweetfern Geometer  
 Delicate Cynia  
 Curve-lined Angle  
 The Small Engrailed  
 Autumnal Moth  
 Snowy Geometer Moth  
 Lesser Grapevine Looper Moth  
 White Eulithis  
 Sharp-angled Carpet  
 Common Eupithecia Moth  
 Curve-toothed Geometer  
 Common Spring Moth  
 Pale Homochlodes Moth  
 One-spotted Variant  
 Bent-Line Gray  
 Hemlock Looper  
 White Spring Moth  
 Common Lytrosis  
 Common Angle  
 Canadian Melanolophia  
 Signate Melanolophia  
 Horned Spanworm Moth  
 Red-bordered Emerald Moth  
 Winter Moth (Spruce Budworm)  
 The Gem  
 Green Pug Moth  
 Juniper Geometer  
 Small Phigalia  
 Common Tan Wave  
 Large Maple Spanworm  
 Porcelain Gray  
 Large Lace-border Moth  
 Northern Selenia  
 Lesser Maple Spanworm  
 Yellow Wooly Bear  
 Wavy-lined Emerald Moth  
 Southern Emerald Moth  
 White Slant-line  
 Yellow Slant-line  
 White Striped Black  
 False Crocus Geometer

**Geometridae**

*Besma quercivoraria*  
*Campaea perlata*  
*Caripeta piniata*  
*Coryphista meadii*  
*Costaconvexa centrostrigaria*  
*Cyclophora pendulinaria*  
*Cynia tenera*  
*Digrammia continuata*  
*Ectropis crepuscularia*  
*Epirrita autumnata* New  
*Eugonobapta nivosaria* New  
*Eulithis diversilineata*  
*Eulithis explanata* New  
*Euphyia intermediata*  
*Eupithecia miserulata*  
*Eutrapela clemataria* New  
*Heliomata cycladata* New  
*Homochlodes fritillaria* New  
*Hypagyrtis ester/unipunctata*  
*Iridopsis larvaria*  
*Lambdina fiscellaria*  
*Lomographa vestaliata*  
*Lytrosis unitaria*  
*Macaria aemulataria*  
*Melanolophia canadaria*  
*Melanolophia signataria*  
*Nematocampa resistaria*  
*Nemoria lixaria*  
*Operophtera brumata-bruceata* PD, New  
*Orthonama obstipata*  
*Pasiphila rectangulata* New  
*Patalene olyzonaria*  
*Phigalia strigataria* New  
*Pleuroprucha insulsaria*  
*Prochoerodes lineola*  
*Protoarmia porcelaria*  
*Scopula limboundata*  
*Selenia alciphearia*  
*Speranza pustularia*  
*Spilosoma virginica*  
*Synchlora aerata*  
*Synchlora frondaria*  
*Tetracis cachexiata* New  
*Tetracis crocallata* New  
*Trichodezia albovittata* New  
*Xanthotype urticaria* New

**Leaf Blotch Miner Moths**

A Hazelnut Leaf Miner

**Lappet Moths**

Eastern Tent Caterpillar Moth

Forest Tent Caterpillar Moth

**Slug Caterpillar Moths**

Yellow-collared Slug Moth

Yellow-shouldered Slug Moth

**Cutworm Moths**

Elder Shoot Borer Moth

American Dagger

Green Marvel Moth

Copper Underwing

Yellow-headed Cutworm

Yellow Three-spot

Silver-spotted Fern Moth

Soybean Looper Moth

Brown Hooded Owlet

Beautiful Wood-nymph

Morrison's Sallow

Masters Dart

Subgothic Dart

The Wedgling

Harris Three-Spot

Large Hypenodes

Green Leuconycta Moth

Armyworm Moth

Gray Half-Spot

Large Yellow Underwing

Eastern Panthea

Maple Looper Moth

Brown Angle Shades Moth

Small Bird-dropping Moth

Pink-spotted Dart

Bicolored Sallow

**Nolid Moths**

Sweet Pepperbush Nola Moth

**Prominent Moths**

Gray Furcula

Common Gluphisia

White Blotched Heterocampa Moth

Double-toothed Prominent

**Oecophorid Moths**

Gold-striped Leaf-tier Moth

**Bagworm Moths**

Common Bagworm Moth

**Gracillariidae***Cameraria corylisella***Lasiocampidae***Malacosoma americana**Malacosoma disstria***Limacodidae***Apoda y-inversum**Lithacodes fasciola***Noctuidae***Achatodes zeae**Acronicta americana**Agriopodes fallax**Amphipyra pyramidoides**Apamea amputatrix**Apamea helva**Callopietria cordata**Chrysodeixis includens**Cucullia convexipennis**Eudryas grata**Eupsilia morrisoni**Feltia herilis**Feltia subgothica**Galgula partita**Harrisimemna trisignata**Hypenodes caducus**Leuconycta diptheroides**Mythimna unipuncta**Nedra ramosula**Noctua pronuba**Panthea furcilla**Parallelia bistriaris**Phlogophora periculosa**Ponometia erastrioides**Pseudohermonassa bicarnea**Sunira/Agrochola bicolarago***Nolidae***Nola clethrae***Notodontidae***Furcula cinerea**Gluphisia septentrionis**Heterocampa umbrata**Nerice bidentata***Oecophoridae***Machimia tentoriferella***Psychidae***Psyche casta*

New

New

New

New

New

New

New

New

New

New

New

New

New

New

New

New

**Plume Moths**

Grape Plume Moth

**Snout (Pyrallid) Moths**

Leaf Crumpler Moth

Acorn Moth

Drab Condylolomia Moth

Pink-fringed Dolichomia Moth

Yellow-fringed Dolichomia Moth

Boxwood Leaf-tier Moth

Clover Hayworm Moth

Meal Moth

**Saturnid Moths**

Luna Moth

Polyphemus Moth

Promethea Moth

Rosy Maple Moth

Cecropia Moth

**Clear-wing Moths**

Virginia Creeper Clearwing Moth

**Sphinx & Hawk Moths**

Pink-spotted Hawk Moth

Nessus Sphinx

Waved Sphinx

Azalea Sphinx

Virginia Creeper Sphinx Moth

Pandorus Sphinx

Snowberry Clearwing

Hummingbird Clearwing

Southern Pine Sphinx

Five-spotted Hawk (Tomato Hornworm)

Carolina Sphinx

Blinded Sphinx Moth

Abbott's Sphinx

Great Ash Sphinx

**Clothes Moths**

Common Clothes Moth

**Tortricid Moths**

Broken-banded Leafroller Moth

Locust Twig Borer Moth

Virginia Pseudexentera Moth

Psychedelic Jones Moth

**Leaf Skeletonizer Moths**

Grapeleaf Skeletonizer

**VI | 10. Mantids (1)****Mantises**

Chinese Mantid

**Pterophoridae***Geina periscelidactylus*

New

**Pyrallidae***Acrobasis indigenella**Blastobasis glandulella**Condylolomia participalis**Dolichomia binodulalis**Dolichomia olinalis**Galasa nigrinodis**Hypsopygia costalis**Pyrallis farinalis*

New

**Saturnidae***Actias luna**Antheraea polyphemus**Callosamia promethea**Dryocampa rubicunda**Hyalophora cecropia***Sesiidae***Albuna fraxini***Sphingidae***Agrius cingulata**Amphion floridensis*

New

*Ceratomia undulosa**Darapsa choerilus*

New

*Darapsa myron**Eumorpha pandorus**Hemaris diffinis**Hemaris thysbe**Lapara coniferarum**Manduca quinquemaculata**Manduca sexta*

New

*Paonias excaecatus**Sphecodina abbottii*

New

*Sphinx chersis***Tineidae***Tineola bisselliella*

New

**Tortricidae***Choristoneura fractivittana*

New

*Ecdytolopha insitiana*

New

*Pseudexentera virginiana*

New

*Thaumatographa jonesi***Zygaenidae***Harrisina americana***Mantodea****Mantidae***Tenodera aridifolia sinensis*



**VI I 11. Alderflies/Fishflies/Dobsonflies (2)****Fishflies & Dobsonflies**

Summer Fishfly  
Fishfly

**VI I 12. Bristletails (1)****Jumping Bristletails**

N/A

**VI I 13. Nerve-Wings (4)****Green Lacewings**

Golden-eyed Lacewing

**Brown Lacewings**

Micromus

**Mantidflies (Mantid Lacewings)**

Brown Mantidfly

**Antlions**

An Antlion

**VI I 14. Damselflies (29)****Broad-winged Damselflies**

River Jewelwing  
Ebony Jewelwing

**Pond Damselflies**

Eastern Red Damsel  
Blue-fronted Dancer  
Variable Dancer  
Aurora Damsel  
Azure Bluet  
Boreal Bluet  
Familiar Bluet  
Turquoise Bluet  
Marsh Bluet  
Stream Bluet  
Skimming Bluet  
New England Bluet  
Orange Bluet  
Slender Bluet  
Vesper Bluet  
Lilypad Forktail  
Fragile Forktail  
Eastern Forktail  
Sphagnum Sprite  
Sedge Sprite

**Spreadwings**

Spotted Spreadwing  
Northern Spreadwing  
Amber-winged Spreadwing  
Sweetflag Spreadwing  
Elegant Spreadwing

**Megaloptera****Corydalidae**

*Chauliodes pectinicornis* New  
*Chauliodes rastricornis*

**Microcoryphia****Machilidae**

*Trigoniophthalmus alerternatus* New

**Neuroptera****Chrysopidae**

*Chrysopa oculata* New

**Hemerobiidae**

*Micromus* sp. New

**Mantispidae**

*Climaciella brunnea*

**Myrmeleontidae**

*A Myrmeleontidae* New

**Odonata 1: Zygoptera****Calopterygidae**

*Calopteryx aequabilis*  
*Calopteryx maculata*

**Coenagrionidae**

*Amphiagrion saucium*  
*Argia apicalis* New  
*Argia fumipennis*  
*Chromagrion conditum*  
*Enallagma aspersum* New  
*Enallagma boreale*  
*Enallagma civile*  
*Enallagma divigans*  
*Enallagma ebrium* New  
*Enallagma exsulans*  
*Enallagma geminatum*  
*Enallagma laterale*  
*Enallagma signatum*  
*Enallagma traviatum* New  
*Enallagma vesperum* New  
*Ischnura kellicotti*  
*Ischnura posita*  
*Ischnura verticalis*  
*Nehalennia gracilis* New  
*Nehalennia irene* New

**Lestidae**

*Lestes congener* New  
*Lestes disjunctus* New  
*Lestes eurinus* New  
*Lestes forcipatus* New  
*Lestes inaequalis*

Slender Spreadwing  
Swamp Spreadwing  
**VI | 15. Dragonflies (55)**

**Darners**

Canada Darner  
Mottled Darner  
Lance-tipped Darner  
Black-tipped Darner  
Shadow Darner  
Green-striped Darner  
Common Green Darner  
Springtime Darner  
Fawn Darner  
Swamp Darner  
Harlequin Darner  
Cyrano Darner

**Spiketails**

Delta-spotted Spiketail  
Twin-spotted Spiketail  
Arrowhead Spiketail

**Emeralds**

Petite Emerald  
Racket-tailed Emerald  
Beaverpond Baskettail  
Common Baskettail  
Prince Baskettail  
Mocha Emerald  
Clamp-tipped Emerald  
Ringed Boghaunter

**Clubtails**

Lilypad Clubtail  
Unicorn Clubtail  
Black-shouldered Spinyleg  
Lancet Clubtail  
Dusky Clubtail

**Skimmers**

Calico Pennant  
Halloween Pennant  
Eastern Pondhawk  
Chalk-fronted Corporal  
Frosted Whiteface  
Hudsonian Whiteface  
Dot-tailed Whiteface  
Belted Whiteface  
Golden-winged Skimmer  
Spangled Skimmer  
Slaty Skimmer

*Lestes rectangularis*  
*Lestes vigilax*

**Odonata 2: Anisoptera**

**Aeshnidae**

*Aeshna canadensis* New  
*Aeshna clepsydra* New  
*Aeshna constricta*  
*Aeshna tuberculifera* New  
*Aeshna umbrosa*  
*Aeshna verticalis*  
*Anax junius*  
*Basiaeshna janata* New  
*Boyeria vinosa* New  
*Epiaeschna heros*  
*Gomphaeschna furcillata*  
*Rhionaeschna mutata* New

**Cordulegastridae**

*Cordulegaster diastatops* New  
*Cordulegaster maculata*  
*Cordulegaster obliqua*

**Corduliidae**

*Dorocordulia lepida*  
*Dorocordulia libera*  
*Epitheca canis*  
*Epitheca cynosura*  
*Epitheca princeps*  
*Somatochlora linearis* SC, New  
*Somatochlora tenebrosa* New  
*Williamsonia lintneri* T, New

**Gomphidae**

*Arigomphus furcifer*  
*Arigomphus villosipes*  
*Dromogomphus spinosus*  
*Phanogomphus exilis*  
*Phanogomphus spicatus* New

**Libellulidae**

*Celithemis elisa*  
*Celithemis eponina*  
*Erythemis simplicicollis*  
*Ladona julia*  
*Leucorrhinia frigida*  
*Leucorrhinia hudsonica*  
*Leucorrhinia intacta*  
*Leucorrhinia proxima* New  
*Libellula auripennis*  
*Libellula cyanea*  
*Libellula incesta*

Widow Skimmer	<i>Libellula luctuosa</i>	
Twelve-spotted Skimmer	<i>Libellula pulchella</i>	
Four-spotted Skimmer	<i>Libellula quadrimaculata</i>	
Painted Skimmer	<i>Libellula semifasciata</i>	
Elfin Skimmer	<i>Nannothemis bella</i>	New
Blue Dasher	<i>Pachydiplax longipennis</i>	
Wandering Glider	<i>Pantala flavescens</i>	New
Spot-winged Glider	<i>Pantala hymenaea</i>	New
Eastern Amberwing	<i>Perithemis tenera</i>	
Common Whitetail	<i>Plathemus lydia</i>	
Cherry-faced Meadowhawk	<i>Sympetrum internum</i>	
Band-winged Meadowhawk	<i>Sympetrum semicinctum</i>	
Autumn Meadowhawk	<i>Sympetrum vicinum</i>	
Carolina Saddlebags	<i>Tramea carolina</i>	New
Black Saddlebags	<i>Tramea lacerata</i>	
<b>Cruisers</b>	<b>Macromiidae</b>	
Stream Cruiser	<i>Didymops transversa</i>	New
<b>VI   16. Grasshoppers &amp; Crickets (15)</b>	<b>Orthoptera</b>	
	<b>Acrididae</b>	
Sulphur-winged Grasshopper	<i>Arphia sulphurea</i>	New
Green-striped Grasshopper	<i>Chortophaga viridifasciata</i>	New
Carolina Grasshopper	<i>Dissosterira carolina</i>	New
Two-striped Grasshopper	<i>Melanoplus bivittatus</i>	New
Differential Grasshopper	<i>Melanoplus differentialis</i>	New
Red-legged Grasshopper	<i>Melanoplus femurrubrum</i>	New
Grizzly Spur-throat Grasshopper	<i>Melanoplus punctulatus</i>	New
<b>True Crickets</b>	<b>Gryllidae</b>	
Broad-winged Tree Cricket	<i>Oecanthus latipennis</i>	New
Pine Tree Cricket	<i>Oecanthus pini</i>	
Red-headed Bush Cricket	<i>Phyllopalpus pulchellus</i>	New
<b>Pygmy Grasshoppers</b>	<b>Tetrigidae</b>	
Black-sided Pygmy Grasshopper	<i>Tettigidea lateralis</i>	New
<b>Katydid</b>	<b>Tettigoniidae</b>	
Short-winged Meadow Katydid	<i>Conocephalus brevipennis</i>	New
Lesser Pine Katydid	<i>Orchelimum minor</i>	New
Rough-winged Katydid	<i>Pterophylla camellifolia</i>	New
Scudder's Bush Katydid	<i>Scudderia</i> sp.	New
<b>VI   17. Walking Sticks (1)</b>	<b>Phasmida</b>	
	<b>Diapheromeridae</b>	
Northern Walking Stick	<i>Diapheromera femorata</i>	
<b>VI   18. Barklice (1)</b>	<b>Psocoptera</b>	
	<b>Psocidae</b>	
Tree Cattle	<i>Cerastipsocus venosus</i>	New
<b>VI   19. Thrips (1)</b>	<b>Thysanoptera</b>	
	<b>Phlaeothripidae</b>	
A Tube-tailed Thrip	<i>A Phlaeothripidae</i>	

**VII. VERTEBRATE ANIMALS (305 \*, 325)****VERTEBRATA****VII A. Bony Fishes \* (13 \*, 33)****COMMON NAME****VII A 1. (3 \*, 10)****Suckers**

White Sucker  
Creek Chubsucker

**Cyprinids**

Goldfish \*  
Common Carp \*  
Common Shiner  
Golden Shiner \*  
Bridle Shiner  
Spottail Shiner  
Blacknose Dace  
Fallfish

**VII A 2. (0 \*, 1)****Topminnows & Killifishes**

Banded Killifish

**VII A 3. (0 \*, 1)****Smelts**

Rainbow Smelt

**VII A 4. (4 \*, 11)****Basses & Sunfishes**

Banded Sunfish  
Redbreast Sunfish  
Green Sunfish  
Pumpkinseed \*  
Bluegill  
Smallmouth Bass  
Largemouth Bass \*  
Black Crappie \*

**Temperate Basses**

White Perch

**Darters & Perches**

Swamp Darter  
Yellow Perch \*

**VII A 5. (4 \*, 7)****Pickerels**

Redfin Pickerel  
Northern Pike \*  
Tiger Muskellunge  
Northern Chain Pickerel \*

**Trout & Salmon**

Rainbow Trout \*  
Brown Trout

**Osteichthyes****GENUS AND SPECIES****STATUS****Cypriniformes****Catostomidae**

*Catostomus commersonii* NT, AP  
*Erimyzon oblongus* N, AP

**Cyprinidae**

*Carassius auratus auratus* I  
*Cyprinus carpio* I  
*Luxilus cornatus* N, AP  
*Notemigonus crysoleucas* N, New  
*Notropis bifrenatus* N, SC  
*Notropis hudsonius* N  
*Rhinichthys atratulus* N, AP  
*Semotilus corporalis* N, AP

**Cyprinodontiformes****Fundulidae**

*Fundulus diaphanous* N, AP

**Osmeriformes****Osmeridae**

*Osmerus mordax* NT

**Perciformes****Centrarchidae**

*Enneacanthus obesus* N, AP  
*Lepomis auritus* N  
*Lepomis cyanellus* NT  
*Lepomis gibbosus* N, New  
*Lepomis machrochirus* NT  
*Micropterus dolomieu* NT  
*Micropterus salmoides* NT  
*Pomoxis nigromaculatus* NT

**Moronidae**

*Morone americana* NT

**Percidae**

*Etheostoma fusiforme* N, AP  
*Perca flavescens* NT

**Salmoniformes****Esocidae**

*Esox americanus americanus* N  
*Esox lucius* NT  
*Esox lucius x Esox masquinongy* NH  
*Esox niger* NT

**Salmonidae**

*Oncorhynchus mykiss* NT  
*Salmo trutta* I

Brook Trout *	<i>Salvelinus fontinalis</i>	N, AP
<b>VII A 6. (2 *, 3)</b>	<b>Siluriformes</b>	
<b>Catfishes</b>	<b>Ictaluridae</b>	
White Catfish *	<i>Ameiurus catus</i>	N
Yellow Bullhead	<i>Ameiurus natalis</i>	N
Brown Bullhead *	<i>Ameiurus nebulosus</i>	N, New

Species with an asterisk (\*) have been observed in Carlisle. The remainder are known in the Concord River drainage area.

Carlisle count is given, followed by total.

## VII B. Amphibians (15)

### COMMON NAME

### VII B 1. Salamanders (6)

#### Mole Salamanders

- Blue-spotted Salamander
- Spotted Salamander

#### Lungless Salamanders

- Northern Two-lined Salamander
- Four-toed Salamander
- Eastern Red-backed Salamander

#### Newts

- Eastern Newt

### VII B 2. Toads & Frogs (9)

#### Toads

- American Toad
- Fowler's Toad

#### Treefrogs

- Gray Treefrog
- Spring Peeper

#### Frogs

- American Bullfrog
- Green Frog
- Pickerel Frog
- Northern Leopard Frog
- Wood Frog

## Amphibia

### GENUS AND SPECIES

### STATUS

#### Caudata

##### Ambystomatidae

- Ambystoma laterale* N, SC
- Ambystoma maculatum* N

##### Plethodontidae

- Eurycea bislineata* N, New
- Hemidactylium scutatum* N
- Plethodon cinereus* N

##### Salamandridae

- Notophthalmus viridescens* N

#### Anura

##### Bufonidae

- Anaxyrus americanus* N
- Anaxyrus fowleri* N

##### Hylidae

- Hyla versicolor* N
- Pseudacris crucifer* N

##### Ranidae

- Lithobates catesbeianus* N
- Lithobates clamitans* N
- Lithobates palustris* N
- Lithobates pipiens* N, AP
- Lithobates sylvaticus* N

## VII C. Reptiles (13)

### COMMON NAME

### VII C 1. Turtles (7)

#### Snapping Turtles

- Snapping Turtle

#### Pond Turtles

- Painted Turtle
- Spotted Turtle
- Blanding's Turtle
- Wood Turtle
- Eastern Box Turtle

## Reptilia

### GENUS AND SPECIES

### STATUS

#### Testudines

##### Chelydridae

- Chelydra serpentina* N

##### Emydidae

- Chrysemys picta* N
- Clemmys guttata* N
- Emydoidea blandingii* N, T
- Glyptemis insculpta* N, SC
- Terrapene carolina* N, SC

**Musk & Mud Turtles**

Musk Turtle

**VII C 2. Snakes (6)****Colubrids**

Ring-necked Snake

Milk Snake

Northern Water Snake

Dekay's Brownsnake

Eastern Ribbon Snake

Common Garter Snake

**Kinesternidae***Sternotherus odoratus*

N

**Squamata****Colubridae***Diadophis punctatus*

N

*Lampropeltis triangulum*

N

*Nerodia sipedon*

N

*Storeria dekayi*

N

*Thamnophis saurita*

N, AP

*Thamnophis sirtalis*

N

**VII D. Birds (226)****COMMON NAME****VII D 1. (19)****Waterfowl**

Wood Duck

Northern Pintail

Green-winged Teal

Mallard

American Black Duck

Greater White-fronted Goose

Snow Goose

Ring-necked Duck

Greater Scaup

Canada Goose

Bufflehead

Common Goldeneye

Mute Swan

Hooded Merganser

American Wigeon

Gadwall

Black Scoter

Common Merganser

Blue-winged Teal

**VII D 2. (4)****New World Quail**

Northern Bobwhite

**Pheasants, Grouse & Allies**

Ruffed Grouse

Wild Turkey

Ring-necked Pheasant

**VII D 3. (1)****Grebes**

Pied-billed Grebe

**VII D 4. (2)****Pigeons & Doves**

Rock Pigeon

**Aves****GENUS AND SPECIES****STATUS****Anseriformes****Anatidae***Aix sponsa*

s b

*Anas acuta*

o

*Anas crecca*

m

*Anas platyrhynchos*

y b

*Anas rubripes*

AP, w

*Anser albifrons*

o

*Anser caerulescens*

o

*Aythya collaris*

m

*Aythya marila*

o, New

*Branta canadensis*

y b

*Bucephala albeola*

m

*Bucephala clangula*

o

*Cygnus olor*

l, y b

*Lophodytes cucullatus*

s b

*Mareca americana*

o

*Mareca strepera*

o

*Melanitta americana*

o, New

*Mergus merganser*

w

*Spatula discors*

AP, o

**Galliformes****Odontophoridae***Colinus virginianus*

AP, o

**Phasianidae***Bonasa umbellus*

AP, o

*Meleagris gallopavo*

y b

*Phasianus colchicus*

l, o

**Podicipediformes****Podicipedidae***Podilymbus podiceps*

E, m

**Columbiformes****Columbidae***Columba livia*

l, y b

Mourning Dove	<i>Zenaida macroura</i>	y b
<b>VII D 5. (2)</b>	<b>Cuculiformes</b>	
<b>Cuckoos</b>	<b>Cuculidae</b>	
Yellow-billed Cuckoo	<i>Coccyzus americanus</i>	s b
Black-billed Cuckoo	<i>Coccyzus erythrophthalmus</i>	AP, s b
<b>VII D 6. (5)</b>	<b>Caprimulgiformes</b>	
<b>Swifts</b>	<b>Apodidae</b>	
Chimney Swift	<i>Chaetura pelagica</i>	AP, s b
<b>Nightjars &amp; Allies</b>	<b>Caprimulgidae</b>	
Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	SC, o
Common Nighthawk	<i>Chordeiles minor</i>	AP, m
<b>Hummingbirds</b>	<b>Trochilidae</b>	
Ruby-throated Hummingbird	<i>Archilocus colubris</i>	s b
Rufous Hummingbird	<i>Selasphorus rufus</i>	v, Old
<b>VII D 7. (4)</b>	<b>Gruiformes</b>	
<b>Cranes</b>	<b>Gruidae</b>	
Sandhill Crane	<i>Antigone canadensis</i>	v
<b>Rails, Gallinules &amp; Coots</b>	<b>Rallidae</b>	
Common Gallinule	<i>Gallinula galeata</i>	SC, o, Old
Sora	<i>Porzana carolina</i>	AP, o
Virginia Rail	<i>Rallus limicola</i>	s b
<b>VII D 8. (18)</b>	<b>Charadriiformes</b>	
<b>Plovers &amp; Lapwings</b>	<b>Charadriidae</b>	
Killdeer	<i>Charadrius vociferous</i>	s b
<b>Gulls, Terns &amp; Skimmers</b>	<b>Laridae</b>	
Herring Gull	<i>Larus argentatus</i>	AP, w
Ring-billed Gull	<i>Larus delawarensis</i>	w
Iceland Gull	<i>Larus glaucoides</i>	o, Old
Glaucous Gull	<i>Larus hyperboreus</i>	o, Old
Great Black-backed Gull	<i>Larus marinus</i>	AP, o
<b>Sandpipers &amp; Allies</b>	<b>Scolopacidae</b>	
Spotted Sandpiper	<i>Actitis macularia</i>	s b
Upland Sandpiper	<i>Bartramia longicauda</i>	E, o
Dunlin	<i>Calidris alpina</i>	o
White-rumped Sandpiper	<i>Calidris fuscicollis</i>	o, New
Pectoral Sandpiper	<i>Calidris melanotos</i>	o
Least Sandpiper	<i>Calidris minutilla</i>	m
Semipalmated Sandpiper	<i>Calidris pusilla</i>	AP, m
Wilson's Snipe	<i>Gallinago delicata</i>	AP, m
American Woodcock	<i>Scolopax minor</i>	AP, s b
Lesser Yellowlegs	<i>Tringa flavipes</i>	o
Greater Yellowlegs	<i>Tringa melanoleuca</i>	o
Solitary Sandpiper	<i>Tringa solitaria</i>	m
<b>VII D 9. (1)</b>	<b>Phaethontiformes</b>	
<b>Tropicbirds</b>	<b>Phaethontidae</b>	
White-tailed Tropicbird	<i>Phaethon lepturus</i>	v

**VII D 10. (1)****Loons**

Common Loon

**VII D 11. (1)****Cormorants**

Double-crested Cormorant

**VII D 12. (9)****Hérons, Egrets & Bitterns**

Great Egret

Great Blue Heron

American Bittern

Cattle Egret

Green Heron

Little Blue Heron

Snowy Egret

Black-crowned Night Heron

**Ibises & Spoonbills**

Glossy Ibis

**VII D 13. (2)****New World Vultures**

Turkey Vulture

Black Vulture

**VII D 14. (12)****Hawks, Eagles & Kites**

Cooper's Hawk

Northern Goshawk

Sharp-shinned Hawk

Golden Eagle

Red-tailed Hawk

Rough-legged Hawk

Red-shouldered Hawk

Broad-winged Hawk

Northern Harrier

Bald Eagle

Mississippi Kite

**Osprey**

Osprey

**VII D 15. (6)****Typical Owls**

Northern Saw-whet Owl

Long-eared Owl

Snowy Owl

Great Horned Owl

Eastern Screech Owl

Barred Owl

**Gaviiformes****Gaviidae***Gavia immer*

SC, o

**Suliformes****Phalacrocoracidae***Phalacrocorax auritus*

AP, o

**Pelecaniformes****Ardeidae***Ardea alba*

AP, o

*Ardea herodias*

y b

*Botaurus lentiginosus*

E, o

*Bubulcus ibis*

o

*Butorides virescens*

s b

*Egretta caerulea*

o

*Egretta thula*

AP, o, Old

*Nycticorax nycticorax*

AP, o

**Threskiornithidae***Plgadis falcinellus*

o, New

**Cathartiformes****Cathartidae***Cathartes aura*

s b

*Coragyps atratus*

o, New

**Accipitriformes****Accipitridae***Accipiter cooperii*

y b

*Accipiter gentilis*

AP, o

*Accipiter striatus*

y

*Aquila chrysaetos*

v

*Buteo jamaicensis*

y b

*Buteo lagopus*

o, Old

*Buteo lineatus*

s b

*Buteo platypterus*

AP, s b

*Circus hudsonius*

T, m

*Haliaeetus leucocephalus*

SC, w

*Ictinia mississippiensis*

v, Old

**Pandionidae***Pandion haliaetus*

m

**Strigiformes****Strigidae***Aegolius acadicus*

o

*Asio otus*

SC, o

*Bubo scandiacus*

o

*Bubo virginianus*

y b

*Megascops asio*

y b

*Strix varia*

y b



**VII D 16. (1)****Kingfishers**

Belted Kingfisher

**VII D 17. (7)****Woodpeckers**

Northern Flicker

Downy Woodpecker

Hairy Woodpecker

Pileated Woodpecker

Red-bellied Woodpecker

Red-headed Woodpecker

Yellow-bellied Sapsucker

**VII D 18. (3)****Falcons & Caracaras**

Merlin

Peregrine Falcon

American Kestrel

**VII D 19. (128)****Larks**

Horned Lark

**Waxwings**

Cedar Waxwing

**Longspurs & Snow Buntings**

Lapland Longspur

Snow Bunting

**Cardinals & Allies**

Northern Cardinal

Blue Grosbeak

Indigo Bunting

Rose-breasted Grosbeak

Scarlet Tanager

Dickcissel

**Treecreepers**

Brown Creeper

**Crows, Jays & Magpies**

American Crow

Common Raven

Fish Crow

Blue Jay

**Finches, Euphonias & Allies**

Common Redpoll

Hoary Redpoll

Evening Grosbeak

House Finch

Purple Finch

Red Crossbill

White-winged Crossbill

**Coraciiformes****Alcedinidae***Megasceryle alcyon*

s

**Piciiformes****Picidae***Colaptes auratus*

s b

*Dryobates pubescens*

y b

*Dryobates villosus*

y b

*Dryocopus pileatus*

y b

*Melanerpes carolinus*

y b

*Melanerpes erythrocephalus*

o

*Sphyrapicus varius*

w

**Falconiformes****Falconidae***Falco columbarius*

m

*Falco peregrinus*

SC, o

*Falco sparverius*

AP, s b

**Passeriformes****Alaudidae***Eremophila alpestris*

AP, o

**Bombycillidae***Bombycilla cedrorum*

y b

**Calcariidae***Calcarius lapponicus*

o, New

*Plectrophenax nivalis*

o

**Cardinalidae***Cardinalis cardinalis*

y b

*Passerina caerulea*

o

*Passerina cyanea*

s b

*Pheucticus ludovicianus*

s b

*Piranga olivacea*

AP, s b

*Spiza americana*

o

**Certhiidae***Certhia americana*

y b

**Corvidae***Corvus brachyrhynchos*

y b

*Corvus corax*

y b

*Corvus ossifragus*

y b

*Cyanocitta cristata*

y b

**Fringillidae***Acanthis flammea*

o

*Acanthis hornemanni*

v

*Coccothraustes vespertinus*

o

*Haemorhous mexicanus*

l, y b

*Haemorhous purpureus*

AP, y

*Loxia curvirostra*

o, New

*Loxia leucoptera*

o

Pine Grosbeak	<i>Pinicola enucleator</i>	o, Old
Pine Siskin	<i>Spinus pinus</i>	m
American Goldfinch	<i>Spinus tristis</i>	y b
<b>Swallows</b>	<b><i>Hirundinidae</i></b>	
Barn Swallow	<i>Hirundo rustica</i>	s b
Bank Swallow	<i>Riparia riparia</i>	AP, s
Northern Rough-winged Swallow	<i>Stelgidopteryx serripennis</i>	o
Tree Swallow	<i>Tachycineta bicolor</i>	s b
<b>Blackbirds, Orioles &amp; Allies</b>	<b><i>Icteridae</i></b>	
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	s b
Bobolink	<i>Dolichonyx orizvorus</i>	AP, m
Rusty Blackbird	<i>Euphagus carolinus</i>	AP, m
Bullock's Oriole	<i>Icterus bullockii</i>	v, New
Baltimore Oriole	<i>Icterus galbula</i>	s b
Orchard Oriole	<i>Icterus spurius</i>	s b
Brown-headed Cowbird	<i>Molothrus ater</i>	s b
Common Grackle	<i>Quiscalus quiscula</i>	s b
Eastern Meadowlark	<i>Sturnella magna</i>	SC, o
<b>Yellow-breasted Chat</b>	<b><i>Icteriidae</i></b>	
Yellow-breasted Chat	<i>Icteria virens</i>	o
<b>Shrikes</b>	<b><i>Laniidae</i></b>	
Northern Shrike	<i>Lanius borealis</i>	w
<b>Mockingbirds &amp; Thrashers</b>	<b><i>Mimidae</i></b>	
Gray Catbird	<i>Dumetella carolinensis</i>	s b
Northern Mockingbird	<i>Mimus polyglottos</i>	y b
Brown Thrasher	<i>Toxostoma rufum</i>	AP, o
<b>Wagtails &amp; Pipits</b>	<b><i>Motacillidae</i></b>	
American Pipit	<i>Anthus rubescens</i>	m
<b>Chickadees &amp; Titmice</b>	<b><i>Paridae</i></b>	
Tufted Titmouse	<i>Baeolophus bicolor</i>	y b
Black-capped Chickadee	<i>Poecile atricapilla</i>	y b
Boreal Chickadee	<i>Poecile hudsonicus</i>	o, Old
<b>New World Warblers</b>	<b><i>Parulidae</i></b>	
Canada Warbler	<i>Cardellina canadensis</i>	AP, m
Wilson's Warbler	<i>Cardellina pusilla</i>	m
Kentucky Warbler	<i>Geothlypis formosus</i>	o
Mourning Warbler	<i>Geothlypis philadelphia</i>	SC, o
Common Yellowthroat	<i>Geothlypis trichas</i>	s b
Worm-eating Warbler	<i>Helmitheros vermivora</i>	o
Orange-crowned Warbler	<i>Leiothlypis celata</i>	o
Tennessee Warbler	<i>Leiothlypis peregrina</i>	m
Nashville Warbler	<i>Leiothlypis ruficapilla</i>	AP, m
Black-and-white Warbler	<i>Mniotilta varia</i>	AP, m
Connecticut Warbler	<i>Oporornis agilis</i>	o, Old
Northern Waterthrush	<i>Parkesia noveboracensis</i>	s b
Louisiana Waterthrush	<i>Parkesia motacilla</i>	AP, m
Ovenbird	<i>Seiurus aurocapilla</i>	s b

Yellow Warbler	<i>Setophaga aestiva</i>	s b
Northern Parula	<i>Setophaga americana</i>	T, m
Black-throated Blue Warbler	<i>Setophaga caerulescens</i>	m
Bay-breasted Warbler	<i>Setophaga castanea</i>	m
Hooded Warbler	<i>Setophaga citrina</i>	o, Old
Yellow-rumped Warbler	<i>Setophaga coronata</i>	m
Prairie Warbler	<i>Setophaga discolor</i>	AP, m
Yellow-throated Warbler	<i>Setophaga dominica</i>	o, New
Blackburnian Warbler	<i>Setophaga fusca</i>	m
Magnolia Warbler	<i>Setophaga magnolia</i>	m
Palm Warbler	<i>Setophaga palmarum</i>	m
Chestnut-sided Warbler	<i>Setophaga pensylvanica</i>	AP, s b
Pine Warbler	<i>Setophaga pinus</i>	s b
American Redstart	<i>Setophaga ruticilla</i>	s b
Blackpoll Warbler	<i>Setophaga striata</i>	SC, m
Cape May Warbler	<i>Setophaga tigrina</i>	m
Black-throated Green Warbler	<i>Setophaga virens</i>	m
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	E, o, Old
Blue-winged Warbler	<i>Vermivora cyanoptera</i>	AP, s b
<b>New World Sparrows</b>	<b><i>Passerellidae</i></b>	
Dark-eyed Junco	<i>Junco hyemalis</i>	w
Swamp Sparrow	<i>Melospiza georgiana</i>	s b
Lincoln's Sparrow	<i>Melospiza lincolnii</i>	m
Song Sparrow	<i>Melospiza melodia</i>	y b
Savannah Sparrow	<i>Passerculus sandwichensis</i>	s
Fox Sparrow	<i>Passerella iliaca</i>	m
Eastern Towhee	<i>Pipilo erythrophthalmus</i>	AP, s b
Vesper Sparrow	<i>Pooecetes gramineus</i>	T, m
American Tree Sparrow	<i>Spizella arborea</i>	w
Clay-colored Sparrow	<i>Spizella pallida</i>	o
Chipping Sparrow	<i>Spizella passerina</i>	s b
Field Sparrow	<i>Spizella pusilla</i>	AP, o
White-throated Sparrow	<i>Zonotrichia albicollis</i>	AP, w
White-crowned Sparrow	<i>Zonotrichia leucophrys</i>	m
<b>Old World Sparrows</b>	<b><i>Passeridae</i></b>	
House Sparrow	<i>Passer domesticus</i>	l, y b
<b>Gnatcatchers</b>	<b><i>Poliophtilidae</i></b>	
Blue-gray Gnatcatcher	<i>Poliophtila caerulea</i>	s b
<b>Kinglets</b>	<b><i>Regulidae</i></b>	
Ruby-crowned Kinglet	<i>Regulus calendula</i>	m
Golden-crowned Kinglet	<i>Regulus satrapa</i>	w
<b>Nuthatches</b>	<b><i>Sittidae</i></b>	
Red-breasted Nuthatch	<i>Sitta canadensis</i>	y b
White-breasted Nuthatch	<i>Sitta carolinensis</i>	y b
<b>Starlings</b>	<b><i>Sturnidae</i></b>	
European Starling	<i>Sturnus vulgaris</i>	l, y b

**Wrens**

Marsh Wren  
 Carolina Wren  
 House Wren  
 Winter Wren

**Thrushes**

Veery  
 Hermit Thrush  
 Swainson's Thrush  
 Wood Thrush  
 Eastern Bluebird  
 American Robin  
 Fieldfare

**Tyrant Flycatchers**

Olive-sided Flycatcher  
 Eastern Wood-Pewee  
 Alder Flycatcher  
 Yellow-bellied Flycatcher  
 Hammond's Flycatcher  
 Least Flycatcher  
 Willow Flycatcher  
 Ash-throated Flycatcher  
 Great Crested Flycatcher  
 Eastern Phoebe  
 Eastern Kingbird

**Vireos**

Yellow-throated Vireo  
 Warbling Vireo  
 Red-eyed Vireo  
 Philadelphia Vireo  
 Blue-headed Vireo

**VII E. Mammals (38)****COMMON NAME****VII E 1. New World Opossums (1)****New World Opossums**

Virginia Opossum

**VII E 2. Rodents (15)****American Beaver**

American Beaver

**Mice, Voles & Lemmings**

Meadow Vole  
 Southern Red-backed Vole  
 Common Muskrat  
 White-footed Deermouse

**Jumping Mice**

Meadow Jumping Mouse

**Troglodytidae**

*Cistothorus palustris* AP, o b  
*Thryothorus ludovicianus* y b  
*Troglodytes aedon* s b  
*Troglodytes hiemalis* y b

**Turdidae**

*Catharus fuscescens* s b  
*Catharus guttatus* s b  
*Catharus ustulatus* m  
*Hylocichla mustelina* AP, s b  
*Sialia sialis* y b  
*Turdus migratorius* y b  
*Turdus pilaris* v

**Tyrannidae**

*Contopus cooperi* AP, m  
*Contopus virens* s b  
*Empidonax alnorum* m  
*Empidonax flaviventris* m  
*Empidonax hammondi* v  
*Empidonax minimus* m  
*Empidonax traillii* s b  
*Myiarchus cinerascens* v  
*Myiarchus crinitus* s b  
*Sayornis phoebe* s b  
*Tyrannus tyrannus* s b

**Vireonidae**

*Vireo flavifrons* s b  
*Vireo gilvus* s b  
*Vireo olivaceus* s b  
*Vireo philadelphicus* o  
*Vireo solitarius* m

**Mammalia****GENUS AND SPECIES****STATUS****Didelphimorphia****Didelphidae**

*Didelphus virginiana* N

**Rodentia****Castoridae**

*Castor canadensis* N

**Cricetidae**

*Microtus pennsylvanicus* N  
*Myodes gapperi* N  
*Ondatra zibethicus* N  
*Peromyscus leucopus* N

**Dipodidae**

*Zapus hudsonius* N, New

<b>Porcupines</b>		
North American Porcupine		
<b>Old World Rats &amp; Mice</b>		
House Mouse		
Brown Rat		
<b>Tree Squirrels &amp; Marmots</b>		
Northern Flying Squirrel		
Southern Flying Squirrel		
Woodchuck		
Eastern Gray Squirrel		
Eastern Chipmunk		
Red Squirrel		
<b>VII E 3. Hares &amp; Rabbits (1)</b>		
<b>Hares &amp; Rabbits</b>		
Eastern Cottontail		
<b>VII E 4. Shrews &amp; Moles (4)</b>		
<b>Shrews</b>		
Northern Short-tailed Shrew		
<b>Moles</b>		
Star-nosed Mole		
Hairy-tailed Mole		
Eastern Mole		
<b>VII E 5. Bats (3)</b>		
<b>Vesper Bats</b>		
Big Brown Bat		
Eastern Red Bat		
Little Brown Bat		
<b>VII E 6. Carnivores (12)</b>		
<b>Dogs, Foxes &amp; Wolves</b>		
Coyote		
Gray Fox		
Red Fox		
<b>Cats</b>		
Bobcat		
<b>Skunks</b>		
Striped Skunk		
<b>Weasels, Minks, Martens &amp; Otters</b>		
North American River Otter		
Fisher		
Ermine		
Long-tailed Weasel		
American Mink		
<b>Raccoons, Coatis &amp; Ringtails</b>		
Raccoon		
<b>Bears</b>		
American Black Bear		
<b>Erethizontidae</b>		
<i>Erithizon dorsatum</i>		N
<b>Muridae</b>		
<i>Mus musculus</i>		I
<i>Rattus norvegicus</i>		I
<b>Sciuridae</b>		
<i>Glaucomys sabrinus</i>		N, AP, Old
<i>Glaucomys volans</i>		N, New
<i>Marmota monax</i>		N
<i>Sciurus carolinensis</i>		N
<i>Tamias striatus</i>		N
<i>Tamiasciurus hudsonicus</i>		N
<b>Lagomorpha</b>		
<b>Leporidae</b>		
<i>Sylvilagus floridanus</i>		N
<b>Eulipotyphla</b>		
<b>Soricidae</b>		
<i>Blarina brevicauda</i>		N
<b>Talpidae</b>		
<i>Condylura cristata</i>		N
<i>Parascalops breweri</i>		N
<i>Scalopus aquaticus</i>		N
<b>Chiroptera</b>		
<b>Vespertilionidae</b>		
<i>Eptesicus fuscus</i>		N, AP
<i>Lasiurus borealis</i>		N, AP
<i>Myotis lucifugus</i>		N, E
<b>Carnivora</b>		
<b>Canidae</b>		
<i>Canis latrans</i>		N
<i>Urocyon cinereoargenteus</i>		N
<i>Vulpes vulpes</i>		N
<b>Felidae</b>		
<i>Lynx rufus</i>		N, AP
<b>Mephitidae</b>		
<i>Mephitis mephitis</i>		N
<b>Mustelidae</b>		
<i>Lontra canadensis</i>		N
<i>Martes pennanti</i>		N
<i>Mustela erminea</i>		N
<i>Mustela frenata</i>		N
<i>Neovison vison</i>		N
<b>Procyonidae</b>		
<i>Procyon lotor</i>		N
<b>Ursidae</b>		
<i>Ursus americanus</i>		N, AP

**VII E 7. Even-toed Ungulates (2)**

**Deer, Elk & Moose**

Moose  
White-tailed Deer

***Artiodactyla***

***Cervidae***

*Alces americanus*  
*Odocoileus virginianus*

N, AP  
N

# Invasive and Other Problem Plants

## Invasives Currently in Carlisle

Massachusetts Invasive Plant Advisory Group (MIPAG) “Invasive” and/or  
SuAsCo Cooperative Invasive Species Management Area ( CISMA) “Priority Invasive”

COMMON NAME	GENUS AND SPECIES	LIFE FORM
Norway Maple	<i>Acer platanoides</i>	Tree
Tree of Heaven	<i>Ailanthus altissima</i>	Tree
Black Locust	<i>Robinia pseudoacacia</i>	Tree
Japanese Barberry	<i>Berberis thunbergii</i>	Shrub
Autumn Olive	<i>Elaeagnus umbellata</i>	Shrub
Winged Euonymus (Burning Bush)	<i>Euonymus alatus</i>	Shrub
Glossy Buckthorn	<i>Frangula alnus</i>	Shrub
Morrow’s Honeysuckle	<i>Lonicera morrowii</i>	Shrub
Tatarian Honeysuckle	<i>Lonicera tatarica</i>	Shrub
Common Buckthorn	<i>Rhamnus cathartica</i>	Shrub
Multiflora Rose	<i>Rosa multiflora</i>	Shrub
Gray Willow	<i>Salix cinerea</i>	Shrub
Porcelain Berry	<i>Ampelopsis heterophylla</i>	Vine
Oriental (Asian) Bittersweet	<i>Celastrus orbiculatus</i>	Vine
Black Swallowwort	<i>Cynanchum louiseae</i>	Vine
Moneywort	<i>Lysimachia nummularia</i>	Vine
Bishop’s Goutweed	<i>Aegopodium podagraria</i>	Herb
Garlic Mustard	<i>Alliaria petiolata</i>	Herb
Carolina Fanwort	<i>Cabomba caroliniana</i>	Herb
Spotted Knapweed	<i>Centaurea stoebe</i>	Herb
Japanese Knotweed	<i>Fallopia japonica</i>	Herb
Lesser Celandine (Fig Buttercup)	<i>Ficaria verna</i>	Herb
Dame’s Rocket	<i>Hesperis matronalis</i>	Herb
Yellow Iris	<i>Iris pseudacorus</i>	Herb
Purple Loosestrife	<i>Lythrum salicaria</i>	Herb
Eurasian Water Milfoil	<i>Myriophyllum spicatum</i>	Herb
Reed Canary Grass	<i>Phalaris arundinacea</i>	Herb
Common Reed	<i>Phragmites australis</i>	Herb
Curly-leaved Pondweed	<i>Potamogeton crispus</i>	Herb
Water Chestnut	<i>Trapa natans</i>	Herb

## Early Detection: Invasives to Watch

- \* MIPAG “Likely Invasive” and/or CISMA “Early Detection” species with at least one known Carlisle observation
- \*\* Not meeting MIPAG or CISMA criteria so not listed as Invasive, but found in Carlisle and of some local concern
- \*\*\* Not yet known in Carlisle but particularly aggressive

COMMON NAME	GENUS AND SPECIES	LIFE FORM
Japanese (Amur) Cork Tree	<i>Phellodendron amurense</i>	Tree *
European Barberry	<i>Berberis vulgaris</i>	Shrub *
Narrow-leaved Bittercress	<i>Cardamine impatiens</i>	Herb *
Japanese Stilt Grass	<i>Microstegium vimineum</i>	Herb *
True Forget-me-not	<i>Myosotis scorpioides</i>	Herb *
Creeping Buttercup	<i>Ranunculus repens</i>	Herb *
Colt’s Foot	<i>Tussilago farfara</i>	Herb *
European Spindle Tree	<i>Euonymus europaea</i>	Shrub **
Climbing Spindle Tree (Winter Creeper)	<i>Euonymus fortunei</i>	Shrub/Vine **
Mile-a-Minute Vine	<i>Persicaria perfoliata</i>	Vine ***
Wild Chervil	<i>Anthriscus sylvestris</i>	Herb ***
Wall Lettuce	<i>Mycelis muralis</i>	Herb ***

## Problem Native Species

COMMON NAME	GENUS AND SPECIES	LIFE FORM
Poison Ivy	<i>Toxicodendron radicans</i>	Vine



## Forest Pests and Diseases

COMMON NAME	GENUS AND SPECIES	TAXONOMIC GROUP	PRESENCE
<b>Currently in Carlisle</b>			
Ash Yellows	<i>Candidatus Phytoplasma fraxinii</i>	Bacteria	Inferred
Honey Mushroom	<i>Armillaria mellea complex</i>	Fungi	Verified
Chestnut Blight	<i>Cryphonectria parasitica</i>	Fungi	Inferred
Eastern White Pine Needle Disease	<i>Lecanosticta acicula</i> ; others	Fungi	Inferred
Coral-spot Nectria Canker	<i>Nectria cinnibarina</i>	Fungi	Verified
Dutch Elm Disease	<i>Ophiostoma ulmi</i> , <i>O. novo-ulmi</i>	Fungi	Inferred
Emerald Ash Borer	<i>Agrilus planipennis</i>	Beetles	Inferred
Hemlock Woolly Adelgid	<i>Adelges tsugae</i>	True Bugs	Verified
Gypsy Moth	<i>Lymantria dispar</i>	Moths	Verified
Winter Moth	<i>Operophtera brumata</i>	Moths	Verified
<b>Could Reach Carlisle</b>			
Asian Longhorned Beetle	<i>Anoplophora glabripennis</i>	Beetles	
Southern Pine Beetle	<i>Dendroctonus frontalis</i>	Beetles	
Black Oak Gall Wasp	<i>Zatettia davisae</i> Buffington	Social Insects	

**Appendix E**

**Template for Email Sent to the Conservation Administrator  
of Each of the Six Contiguous Towns:**

**Acton, Bedford, Billerica, Chelmsford, Concord, Westford**

## **Appendix E: Template for Email Sent to the Conservation Administrator of Each of the Six Contiguous Towns: Acton, Bedford, Billerica, Chelmsford, Concord, Westford**

Dear ...

Thank you for agreeing to meet with me and an Open Space & Recreation Plan Committee member to discuss issues related to Open Space and Recreation (OS&R) planning. As I mentioned in our phone conversation, we have begun the process of updating Carlisle's OS&R Plan and as we have done in the past are reaching out to our neighboring towns to gather information and to explore how we might work cooperatively for our mutual benefit. In our upcoming meeting, we are interested in discussing the following issues that are potentially of common interest and concern.

- ***Identifying significant shared resources*** – Significant shared natural resources are those with common boundaries, including view sheds, surface waters, drinking water resources, and open land (including open-land connections); we want to discuss respective plans and approaches for maintaining conservation and recreation values on parcels that are already protected and on undeveloped parcels that are not currently protected. Other shared recreation resources to discuss would include recreation facilities and programs that our towns currently share.
- ***Local/regional current and future influencing factors*** – We want to identify known and anticipated activities that could strain open space/recreation-related resources and therefore should be incorporated into the planning process, such as proposed or planned development projects or any activities in towns that could directly or indirectly affect our respective towns.
- ***Exploring new opportunities for sharing resources/technical expertise*** – We want to discuss cooperative efforts to control invasive species; encourage native plants, recent policy developments and compatibility; deer population issues and options; management issues and strategies for protecting rare and threatened species; and recreation programs for seniors and other town residents.

We look forward to meeting with you on \_\_\_\_\_ at \_\_\_\_\_. This information sharing is not only a key component to the open space planning process, but also a wonderful opportunity to explore ways in which our towns might work together to achieve our common goals. Thank you again for your interest and cooperation.

Sincerely,

Sylvia Willard  
Carlisle Conservation Administrator

**Appendix F****ADA Access Self-Evaluation and Compliance with ADA Requirements**

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## **Appendix F: ADA Access Self-Evaluation and Compliance with ADA Requirements**

### **Summary**

The accessibility of Town facilities was determined through the self-evaluation process for this plan by the Town Administrator (who is also the Town ADA Coordinator), the directors of the library and the Council on Aging, and the Recreation Commission to evaluate programs offered by the Town and the buildings where the programs take place. Public lands, trails, and parking areas were evaluated by the Conservation Commission Administrator and the Chair of the Trails Committee. The three churches in town were included in the self-evaluation process. The self-evaluations were reviewed and transition plans were developed as required. (*See Table 11 for transition plans.*) Completed self-evaluation forms and transition plans are kept on file in the town offices of the Conservation Commission and the Town Administrator.

### **Current Accessibility in Carlisle**

Carlisle has made many improvements to its Open Space and Recreation facilities to make the town more accessible. These include a pedestrian pathway system radiating from the Town Center, accessible pathways created in conjunction with residential developments in several locations around town, ADA-compliant crosswalks in the Town Center, and improved accessibility at the renovated school. Accessible trails exist in GBFSP, as do interpretive programs that accommodate the disabled. Accessible restroom facilities exist in two locations in GBFSP and at the recreation fields on the Banta-Davis Land. A running track and other paths within Banta-Davis are also accessible. All buildings used for programs hosted by the Recreation Commission and the Council on Aging provide accessible restrooms and comply with ADA. The Beede Center swimming facility in Concord, used by many Carlisle residents, is fully accessible and houses a state-of-the-art warm therapy pool with lifts.

Buildings and facilities for public use are limited in Carlisle. It is a small community and efficiently uses its publicly accessible buildings for many purposes. The main rooms for evening meetings in Town Hall are used for daytime exercise sessions and drawing classes. The library hosts events in the Hollis Room on the third floor, accessible via elevator. The churches host lectures, luncheons, and concerts. The school hosts indoor walking for seniors and after-school programs for youth. An accessible common room in the senior housing complex near the Town Center is used occasionally by the Council on Aging for lectures, meals, and other gatherings. There is also an ADA-accessible common room at the senior housing development at Benfield Farms; it has been used for remote attendance at Town Meeting for those with difficulties getting to the school.

### **Trails and Conservation Lands**

Malcolm Meadows has a handicapped parking lot for a trail fully accessible to wheelchairs, but the trail needs repair. There are benches along the trail. A suggestion to add a picnic table will require consideration of the cost of maintenance and concerns about trash being left behind. Some of the conservation lands such as the Cranberry Bog, Foss Farm, and GBFSP have service roads that can accommodate OPDMDs; further evaluation is needed to determine whether they can be modified to accommodate wheelchairs with appropriate tires.

Parking areas providing access to the trails are limited and have generally not been among the Town's top priorities for maintenance. Hardpack surfacing would be needed in many areas to

make the lots wheelchair accessible. In addition, for the few accessible trails, the slopes from the parking lots to trails would generally need re-grading to meet ADA standards.

Trail signage—although with dimensional, routed letters and with high-contrast backgrounds—was placed according to older standards from the Appalachian Mountain Club, does not account for ADA height requirements, and is generally not easily legible for the visually impaired. Many signs have been placed at or above 60 inches above ground level to account for growth of underbrush and for visibility in the forest. Initial efforts to make signage more accessible to persons in wheelchairs and more legible for the visually impaired should be concentrated on the few trails that are accessible.

Table 11 includes transition plans for improving parking areas, adding handicapped parking spots, regarding slopes from parking areas to the few accessible trails, adding benches or picnic tables, and evaluating and improving signage.

### **Other Power-Driven Mobility Devices**

When the OPDMD regulations were revised in 2020, all trails were re-assessed for terrain type and suitability for OPDMDs. The trails are grouped into three categories: Service Trails, allowing access to OPDMDs no more than 36 inches wide; Wide Single-Track Trails, allowing access to OPDMDs no more than 26 inches wide and wheels no greater than 6 inches wide; and Narrow Single-Track Trails, including all trails not designated as Service or Wide Single-Track Trails, which are off limits to OPDMDs.

Simultaneously, terrain type and slope were evaluated due to the numerous tree roots, wetland areas, and large bedrock outcroppings or boulders that impede accessibility and that cannot reasonably be mitigated. A list of trails and assessments of terrain are on file with the Conservation Commission and the ADA Coordinator.

### **Recreation Facilities**

Carlisle's recreation facilities are generally handicapped accessible. Table 11 includes transition plans related to better parking, more handicapped spaces, and evaluation of heavy, non-automatic doors in the Carlisle Schools.

### **Individuals Involved in the Self-Evaluation Process**

The Committee is grateful to the assistance of many individuals involved in the self-evaluation process, including Town Administrator Tim Goddard, Director of Recreation Holly Mansfield, Conservation Administrator Sylvia Willard, Fire Chief Bryan Sorrows, Library Director Martha Feeney-Patten, COA Director Joan Ingersoll, Wendy Krugh of St. Irene Church, and Tim Gordon of the Congregational Church. We also thank our reviewers for their review of many of the properties, facilities, and trails in spring 2021: Carol Grueneich (Social Worker, Council on Aging), Thomas B. Fitzpatrick (stroke survivor with mobility challenges from left-side hemiparesis (paralysis), Daniel C. Barlow (legally blind) and his family.



Town Administrator  
Tel. (978) 371-6688

**Town of Carlisle**  
OFFICE OF  
SELECT BOARD  
66 Westford Street  
CARLISLE, MASSACHUSETTS 01741  
TEL. 978.369.6136



Fax (978) 318-0098

February 10, 2021

Re: Designation of ADA Coordinator

To Whom It May Concern:

This letter shall serve as notice that Carlisle Town Administrator Timothy D. Goddard has been duly designated and appointed as the Town ADA Coordinator for the purpose of compliance with the Americans with Disabilities Act.

Please feel free to contact this office with any questions.

Sincerely,

DocuSigned by:

*Alan L. Lewis*

8F04ADAE56D5469...

Alan L. Lewis, Chairman  
BOARD OF SELECTMEN

## **From the Personnel Policy of the Town of Carlisle: ADA Policy and Grievance Procedure**

### **21.0 Americans with Disabilities Act**

21-1. *Policy.* The Town of Carlisle does not discriminate on the basis of disability in the admission or access to, or treatment or employment in, its programs or activities. The Town's ADA Coordinator has been designated to monitor compliance with the non-discrimination requirements in the Section 504 regulations and the Americans with Disabilities Act regulations as implemented by the Equal Employment Opportunity Commission and the Department of Justice.

21-2. *Grievance Procedure.* The following grievance procedure is established to meet the requirements of the Americans with Disabilities Act. It may be used by any employee who wishes to file a complaint alleging discrimination on the basis of disability in employment practices and policies or the provision of services, activities, programs, and benefits by the Town of Carlisle.

(a) The complaint should be in writing and contain information about the alleged discrimination such as name, address, telephone number of complainant and location, date and description of the problem. Reasonable accommodations, such as personal interviews or a tape recording of the complainant, will be made available for persons with disabilities who are unable to submit a written complaint.

(b) The complaint should be submitted by the grievant and/or his/her designee as soon as possible but no later than 60 calendar days after the alleged violation to the Carlisle Board of Selectmen and the ADA Coordinator.

(c) Within fifteen calendar days after receipt of the complaint, the ADA Coordinator will meet the complainant to discuss the complaint and possible resolutions. Within 15 calendar days after the meeting, the ADA Coordinator will respond in writing, and where appropriate in a format accessible to the complainant such as audiotape. The response will explain the position of the Town of Carlisle and offer options for substantive resolution of the complaint.

(d) If the response of the ADA Coordinator does not satisfactorily resolve the issue, the complainant and/or his/her designee may appeal the decision of the ADA Coordinator within 15 days after receipt of the response to the Board of Selectmen or their designee.

(e) Within 15 calendar days after receipt of the appeal, the Carlisle Board of Selectmen or their designee will meet with the complainant to discuss the complaint and possible resolutions. Within 15 calendar days after this meeting the Board of Selectmen or their designee will respond in writing, and where appropriate in a format accessible to the complainant, such as audiotape, with a final resolution of the complaint.

(f) All complaints received by the ADA Coordinator, appeals to the Carlisle Board of Selectmen or their designee, and responses from the ADA Coordinator and the Carlisle Board of Selectmen or their designee will be kept by the Town of Carlisle for at least three years.





Town Administrator  
Tel. (978) 371-6688

# Town of Carlisle

OFFICE OF

SELECT BOARD

66 Westford Street

CARLISLE, MASSACHUSETTS 01741

TEL. 978.369.6136



Fax (978) 318-0098

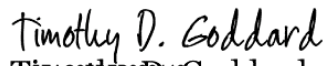
February 10, 2021

To Whom It May Concern:

As Town Administrator/ADA Coordinator for the Town of Carlisle, I hereby attest to the fact that the Town's employment practices are in compliance with the Americans with Disabilities Act with respect to the following: Recruitment, personnel Actions, Leave Administration, training, testing, needed exams/questionnaires, social and recreation programs, fringe benefits, collective bargaining agreements and wage and salary administration.

Additionally, I have attached to this statement a copy of the Town's Personnel Policy regarding Equal Employment Opportunity.

Sincerely,  
DocuSigned by:

  
Timothy D. Goddard  
Town Administrator

## **From the Personnel Policies of the Town of Carlisle**

### **36.0 Equal Employment Opportunity**

36-1. *Policy.* The Town of Carlisle commits itself to the principles and practices of equal employment opportunity, in compliance with Titles VI and VII of the Civil Rights Act of 1964; Executive Order No. 227 as amended; MGL Chapter 151B; and all other applicable Federal and State laws and regulations.



Town Administrator  
Tel. (978) 371-6688

# Town of Carlisle

OFFICE OF

## SELECT BOARD


66 Westford Street  
CARLISLE, MASSACHUSETTS 01741  
TEL. 978.369.6136



Fax (978) 318-0098

### MEMORANDUM

TO: File

FROM: Timothy D. Goddard, Town Administrator <sup>DS</sup> 

RE: Equal Employment Opportunity

DATE: February 10, 2021

Attached please find examples of notices advertising positions available within the past three years and the notations that the Town of Carlisle is an Equal Employment Opportunity/Affirmative Action employer.

The Town of Carlisle does not discriminate in its' employment practices on the basis of disability. Public Notices and other information is made available in accessible format upon request.

## **Example Notice Advertising Position with EEO Notations**

### **Town of Carlisle – Facilities Manager**

The Town of Carlisle seeks qualified and experienced applicants for the part-time up to 18 hour per week position of Facilities Manager. The successful applicant will direct, supervise, and coordinate daily operations of town building repair and maintenance including janitorial, mechanical, electrical, plumbing, building envelope, energy conservation, masonry, carpentry, security, HVAC and other building systems as well as management of building construction/repair activities and perform other related work as required. Experience in building maintenance, construction, repair and operations is preferred. Familiarity with Microsoft Office or equivalent and project management software is desirable. Starting rate is \$50/hour.

A copy of the full job description will be provided on request. Send cover letter and resume to Town Administrator, 66 Westford St., Carlisle, MA 01741, or email in pdf format to [townhall@carlislema.gov](mailto:townhall@carlislema.gov). Position available July 1; resumes accepted until the position is filled. The Town of Carlisle is an AA/EEO.

**Appendix G**  
**Multigenerational Community Center Feasibility Study**

APPENDIX

G



Appendix G: Multigenerational Community Center Feasibility Study

In 2012, the Town acquired six acres off Bedford Road to be used for a group home for adults with special needs and for recreational uses including a senior and/or community center containing recreational facilities. The group home was completed on the front portion of the property in 2017, leaving the back portion of the site, the Moseley Land, to be used for a community center.

With funding from a Community Health Network Area grant, the Town engaged Abacus Architects + Planners to prepare a feasibility study for a multigenerational community center on the site.

A program based on community needs and anticipated uses was developed from input from key stakeholders including the Council on Aging and the Recreation Commission and via a public survey. Survey responses indicate that there is a real need for better facilities for seniors in Carlisle and a need for recreational and socializing facilities for residents of all ages. Combining senior and non-senior facilities provides an opportunity to share spaces in an efficient and cost-effective manner.

The site plan and building configuration selected from multiple options presented are shown at the left. The building roofs would allow for solar panels. Solar pool heaters can extend the swimming season.

The study includes plans for the building to be used as an emergency shelter and as a site for distributing public water or dispensing vaccines.



The proposed site spans the Moseley Land and the Banta-Davis Land. Entrance to the site would be from Bedford Road via the Banta-Davis access drive.



**Above, SITE PLAN**  
The community center faces the Banta-Davis access road across a public green, with parking on either side of the green. A terrace and pool are on the opposite side, looking out onto the Fox Hill Conservation Land. The ball field would be relocated as shown within a currently wooded area of the Banta-Davis Land to accommodate the parking and public green. The site is ideally located adjacent to other community recreational and open-space resources and can be reached by foot from the school without crossing streets.



**Above, BUILDING FLOOR PLAN**  
Three “bars” of enclosed activity spaces surround an open “main street” with low walls and furniture grouping creating gathering spaces and facilitating social interactions. One of the three bars contains a Great Room that can be divided into smaller meeting spaces, a kitchen (with drive-up access for catering and meals-on-wheels deliveries), and storage. A second bar contains offices, administration, work spaces, counseling rooms, and some activity rooms. The third bar encloses larger activity areas and locker rooms. Rooms can be used for a variety of purposes over the course of a day, a week, or a year, although some will have specialty elements for physical activities or arts and crafts. Restrooms will provide an important amenity for people using the Banta-Davis athletic fields.



**Above, VIEW FROM REAR TERRACE**  
In the rear is a landscaped terrace with connections to the adjacent conservation land. The outdoor swimming pool is located in a fenced-in area adjacent to the terrace and positioned near the locker rooms.

*Feasibility study, plans, and renderings by Abacus Architects + Planners, Allston, MA*



**Above, VIEW OF INTERIOR – TAKEN FROM JUST INSIDE THE ENTRY**  
Low walls define quieter spaces within the open interior. Glazed walls provide acoustical separation while allowing glimpses of programs within.

*The Community Center Feasibility Study was funded through CHNA15 with DoN funds from Lahey Hospital and Medical Center and from Winchester Hospital.*



**Appendix H**  
**Recreation Commission: Grievance Policy: Equal Access**

APPENDIX

H

## **Appendix H: Recreation Commission: Grievance Policy: Equal Access**

### **CARLISLE RECREATION COMMISSION** **GRIEVANCE POLICY FOR THE GENERAL PUBLIC**

#### **Equal Access to Facilities and Activities**

1. The Recreation Commission is committed to providing maximum opportunity to receive citizen comments, complaints and to resolve grievances or inquiries.

#### **Administrative Level**

2. The Program Director and/or Administrative Director will be available during office hours to meet with citizens and employees to discuss complaints.
3. When a complaint, grievance or request for program policy interpretation or clarification is received either in writing, through a meeting or telephone call, every effort will be made to create a record regarding the name, address, phone number, nature of the complaint, and program policy interpretation, clarification or resolution.
4. All complaints, grievances or request for program policy interpretation will be responded to by telephone or in writing within ten working days.
5. If the issue is not resolved at this level, it will progress to the Commission level.

#### **Recreation Commission Level**

6. Complaints can be forwarded to any member of the Recreation Commission either in writing or by telephone. The Recreation Commission will respond to the complaint either by telephone or in writing within ten days. If the issue is not resolved at this level, it will progress to the Board of Selectmen level.

#### **Select Board Level**

7. If the grievance is not satisfactorily resolved, citizens will be informed of the opportunity to meet and speak with the Select Board of their complaint.



**Appendix I**  
**Carlisle Planning Board: Development Standards**

APPENDIX

**I**

# Appendix I: Carlisle Planning Board: Development Standards

*“General Development Standards,”* excerpt from Attachment A to the Town of Carlisle Subdivision and other Special Permit development Rules & Regulations from the Planning Board

## **Attachment A** **Development Standards**

### **I. General Development Standards**

A. Introduction: All land development projects in Carlisle shall, as applicable to particular projects and properties, conform to current zoning and land use regulatory standards, including, but not limited to, the Carlisle Zoning Bylaws, the Subdivision Rules and Regulations, the Common Driveway Rules and Regulations, the Conservation Cluster Rules and Regulations, the Senior Residential Open Space Community (“SROSC”) Rules and Regulations, and the Residential Open Space Community (“ROSC”) Rules and Regulations adopted by the Planning Board, the Water Supply and Sewage Disposal Regulations adopted by the Board of Health, and the Wetlands Protection Bylaws and Regulations adopted by Town Meeting and the Conservation Commission (collectively, “Land Use Standards”).

In keeping with over 200 years of development history in Carlisle, new development should be consistent with the immediate neighborhood, make a concerted effort not to detract from existing homes and land development patterns, and assure that development will not adversely impact the environment, particularly the private water sources exclusively relied upon by Carlisle residents. The Town has limited water resources, and has no piped water system—but rather, all homes, businesses, and municipal users rely on individual on-site water wells—and no public wastewater treatment system. Two-acre zoning (one acre in the Town Center) is thus important to the Town of Carlisle to protect water availability and quality. Further, Carlisle has a small population of barely over 5,500 people, a limited tax base, no public transit, and lacks the roadway and utility infrastructure required to support commercial development or other dense development. As a result, the Planning Board must be sensitive to the burden and impact of any increase in housing density.

### **B. Developments shall:**

1. Minimize, to the extent possible, the following:
  - (a) Alteration of ground water, septic water levels or chemical constituents;
  - (b) Alteration or relocation of water ways and drainage patterns;
  - (c) Disruption, reduction of capacity, contamination, and other adverse effects on existing on site and off site drinking water wells;
  - (d) Any use of groundwater for irrigation of landscaping;
  - (e) Alteration of existing, natural grades, and overall volume of cut and fill;
  - (f) Area over which existing vegetation will be disturbed, especially if within 200 feet of a river, pond or stream, or having a slope of more than 15%;
  - (g) Removal of trees greater than eight inches (8”) in diameter, measured at four feet (4’) above ground;
  - (h) Soil loss or instability during and after construction;
  - (i) Alteration or disturbance of land within any flood plain or wetlands area;
  - (j) Blockage of trails or potential trails;
  - (k) Disturbance of important wildlife habitats or corridors, outstanding botanical features, or scenic or historic features;

- (l) Removal of existing stone walls, whether along the boundary of the Development or within the Development;
- (m) Visual prominence of man-made elements which are not necessary for safety or orientation including visibility of building sites from existing streets and existing protected open space;
- (n) Blockage of vistas through new development; and
- (o) Number of driveways exiting onto existing streets.

2. Maximize, to the extent possible, the following:

- (a) Preservation of uncontaminated water resources for drinking water and preservation of legal and practical functionality of existing drinking water wells and existing septic systems;
- (b) Recharge of the underlying water aquifer;
- (c) Visual prominence of natural features of the landscape;
- (d) Legal and physical protection of views from public ways and existing protected open space;
- (e) Connections via publicly accessed trails to and between protected open space and other trails;
- (f) Buffers for and connections among existing protected open spaces;
- (g) Wildlife corridors;
- (h) Preservation of: (a) stone walls, by locating Lot and Parcel boundaries along the existing line of the walls; and (b) scenic points as identified in the Massachusetts Landscape Inventory and historic sites as identified by the Massachusetts Historical Commission, by incorporating them within public open space or easements as provided by the relevant regulation(s); and
- (i) Curvilinear street patterns;

C. Units per acre: As noted above, all land development projects in Carlisle shall, as applicable, conform to current zoning—including density—requirements.

D. Architecture: Detached and attached housing units should be designed to reduce overall visual massing and to blend compatibly with the landscape and with surrounding single-family residential neighborhoods. Building design, including exterior materials, should be in harmony with and enhance the town's existing and historic architectural traditions. The appearance of a gated community is discouraged. The architecture should also provide visual and acoustical screening of HVAC units.

E. Site planning, Height, Set-Backs, Screening, Landscaping, and Lighting: All developments should provide visual screening consistent with the density and setback requirements included within the Zoning Bylaws and incorporated into the engineering design standards of the Carlisle Subdivision Rules and Regulations, Conservation Cluster Regulations, SROSC Regulations, and ROSC Regulations, as applicable. An adequate vegetative buffer should be provided to minimize the visual impact of the development from existing roadways, from protected open space, and from existing and future housing development. Similarly, all developments should rely on and protect the natural features of the site such as open meadow, woodland, hillsides, rock outcroppings, water bodies, open vistas, valuable habitat and wildlife corridors, existing and potential trail connections which can provide public accessibility to open space, and buffers for and connections among existing protected open spaces through careful siting of roadways and structures. Exterior lighting should not impact adjacent residential areas or degrade wildlife habitat. The project design should to the extent possible preserve the existing and natural

landscaping, and additional landscaping should be provided using water efficient plantings of a variety of native species to minimize and if possible eliminate irrigation and to provide visual and noise screening of the development from the street, abutting properties and protected open space. Building height should conform to the requirements of the Zoning Bylaws. Safe and convenient entrance and exit from the proposed development to public streets is required. There should be appropriate street access for the size of the development.

F. Open Space: Consistent with the requirements of the Carlisle Zoning Bylaws and regulations, including, but not limited to the Subdivision Rules and Regulations, the SROSC Regulations, ROSC Regulations, and Conservation Cluster Regulations, as applicable, all developments should to the extent possible set aside, for perpetual protection, sufficient open space to serve the needs of the project residents and ensure that the proposed project is integrated within the existing neighborhood. Open Space is defined as land that is not covered with buildings, roadways, parking or any other structure or impervious surface. Open Space should be selected to provide for recreation purposes and/or to maximize the value of wildlife habitat, should be contiguous to the extent required to preserve significant habitat, should be configured to maximize and preserve large blocks of undisturbed land and should encourage passive recreational opportunities for residents and the public where possible. Open Space should predominantly be left in a natural, undisturbed state. Landscaping of Open Space areas should utilize native vegetation to the extent practical, and should complement the values and functions of the natural resources on the site. In any developments proposed to be denser than underlying zoning would otherwise allow, Open Space is critical to protect the private water sources exclusively relied upon by residents in Carlisle.

G. Development Infrastructure: To avoid adverse environmental and public health impacts, to avoid costly and potentially severe impacts and liability to the applicant, future owners and renters at the development, and abutters from a future failure of on-site and/or off-site drinking water supply wells and wastewater disposal systems (such impacts potentially including but not limited to revocation of the project's and/or abutters' certificates of occupancy for failure to have a safe drinking water supply), and to avoid costly future maintenance problems for future owners and renters at the project, the Board requires compliance with all applicable local Board of Health regulations governing wastewater disposal and water supply development as applied by the Board of Health. The Planning Board will endeavor to coordinate its consideration of applications before it with the Board of Health either through the processes described in Attachment B or otherwise.

H. Green Development Practices: All developments should, to the greatest extent practicable, include strategies for environmentally responsible design as formalized in Leadership in Energy and Environmental Design (LEED) standards, NAHB Model Home Building Guidelines or the ICC National Green Building Standard, all of which minimize the depletion of natural resources; control erosion and minimize impact on natural areas; use native and water efficient plants in landscaping; increase energy efficiency in construction and operations; conserve water through use of efficient fixtures and appliances and irrigation systems using rainwater and greywater; and use environmentally "friendly" materials. To this end, the development should incorporate Low Impact Design (LID) techniques to the greatest extent practicable. The greater the density of the development, the more important the use of these techniques becomes to protecting the environment and on site and off site individual water wells, which are the exclusive source of drinking water for all residents, businesses and municipal users in Carlisle.

**Appendix J**  
**Conservation and Recreation Projects Receiving**  
**Community Preservation Act Funds**

APPENDIX

**J**

## **Appendix J: Conservation and Recreation Projects Receiving Community Preservation Act Funds (by year of Town Meeting vote)**

Carlisle adopted the state's Community Preservation Act (CPA) in 2001. Town citizens elected to levy a 2% surcharge on real estate taxes, excluding the first \$100,000 in assessed value, for three uses: open space (conservation and recreation), historic preservation, and community housing. Conservation and recreation projects receiving funding are listed below.

### **2020**

Greenough Dam	<i>To restore the dam, CPA funds to be 25% match of state grant being sought</i>
---------------	--

### **2019**

Trail Improvements	<i>To cover materials, supported by donated design and labor</i>
Open Space & Recreation Plan	<i>To fund mapping, printing, other expenses</i>

### **2018**

Cranberry Bog House Well	<i>To drill a new well to provide a water supply for the bog house</i>
--------------------------	--

### **2017**

Banta-Davis Little League Field	<i>To improve drainage and restore the field</i>
Woodward property	<i>To purchase 6 acres for Open Space</i>

### **2016**

Sorli Farm	<i>To purchase a Conservation Restriction on 20 acres of the Sorli south field &amp; woodlands</i>
Towle Field	<i>To remove poison ivy and invasives</i>

### **2015**

Concord-Carlisle High School Athletic Facilities	<i>To renovate athletic facilities at the high school</i>
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### **2013**

Mark and Rachel Page Elliott River Preserve	<i>To complete funding for acquisition of the Conservation Restriction</i>
Boardwalk from Banta-Davis to Spalding Field	<i>To connect recreation fields and walking paths</i>
Center Park	<i>Maintenance of park</i>

*Continued on next page*

**2012**

Mark and Rachel Page Elliott River Preserve	<i>To acquire the Conservation Restriction on 9 acres of Open Space</i>
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**2010**

Restoration of Cranberry Bog House	<i>To support agriculture and, by extension, preserve water rights associated with Cranberry Bog operation</i>
Trail Improvements	<i>To cover materials, supported by donated design and labor</i>
Bruce Freeman Rail Trail	<i>To design Carlisle portion of Rail Trail</i>

**2009**

Open Space & Recreation Plan	<i>To fund mapping, printing, other expenses</i>
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**2007**

Signage for Conservation Lands	<i>To repair and provide new signage to encourage respect for Town land and to ensure Town's rights to enforce restrictions</i>
Demolition of Greenough Cottage	<i>To remove deteriorating structure that is potential hazard on conservation land</i>
Footpaths	<i>To construct pedestrian footpath system radiating from Town Center</i>

**2006**

Trail Improvements	<i>To cover materials, supported by donated design and labor</i>
Bruce Freeman Rail Trail	<i>To design Carlisle portion of Rail Trail</i>

**2004**

Benfield Land	<i>To purchase 26 acres as Open Space and 19.23 acres for athletic fields and community housing</i>
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**Appendix K**  
**Town of Carlisle**  
**Complete Streets Policy**

APPENDIX

K



# Appendix K: Town of Carlisle Complete Streets Policy

## I. Vision and Intent

The Town of Carlisle's Complete Street Policy goals are to (1) provide safe and accessible use of our roads by all users and modes (2) improve public and environmental health by encouraging safe walking and bicycle alternatives to vehicle travel; (3) to leverage our network of roads, pathways, and trails to maximize connectivity between home, work, school, and recreation; and (4) to incorporate expansion and enhancements of transportation in our town's Master Plan.

Accordingly, the Town recognizes that all new, maintenance, or reconstruction projects are opportunities to implement Complete Streets. The town will, to the maximum extent possible, design, construct, and maintain all streets to provide for a safe, efficient, accessible, and integrated network of facilities for people of all ages and abilities.

## II. Core Commitment

Users and Modes: Complete Streets are those designed to provide safety and accessibility for people of all ages and abilities; including pedestrians, bicyclists, school bus riders, motorists, commercial vehicles, and emergency vehicles. The implementation of Complete Streets principles contributes to the safety, health, economic viability, and quality of life of our community by improving the pedestrian and vehicular environments.

All Projects and Phases: Where feasible, Complete Streets design recommendations will be incorporated into all transportation infrastructure projects within the public Right-of-Way. This includes both privately funded projects and projects funded by the Town of Carlisle, the State and its agencies, and federally funded programs. The Board of Selectmen; under advisement from various town departments, committees, and boards; will use best judgment regarding the feasibility of applying Complete Streets principles for review and implementation of routine roadway maintenance, upgrades, and expansion projects within the public Right-of-Way.

Clear, Accountable Exceptions: Transportation infrastructure may be excluded from this policy, upon an approval process by the Board of Selectmen, which includes the evaluation of recommendations from various town departments, committees, and boards based on documentation and data that indicate:

- Specific users are prohibited by law, such as limited access highways. In these cases, an effort will be made to provide alternative accommodations.
- Where construction would create significant adverse impacts to streams, wetlands, flood plains, or scenic and historic resources.
- Where Complete Streets measures would constitute a threat to public safety.
- Costs are excessively disproportionate to the benefit.
- Where the public right of way or adjacent land is constrained in a manner that inhibits the addition of transit, bicycle, or pedestrian improvements and no other cost-effective alternatives are available.

### III. Best Practices

Network: This Complete Street Policy will focus on establishing a connected and integrated network of roads, paths, and trails to provide safe and accessible means of travel between home, school, work, recreation, public services, and retail locations. The policy supports the vision of connecting Carlisle to its neighboring employment, education, and recreation opportunities.

Jurisdiction:

1. All transportation infrastructure and street design and construction projects requiring funding or approval by the Town of Carlisle shall adhere to the Town of Carlisle Complete Streets Policy.
2. Projects funded by the State or Federal government; including, but not limited to, Chapter 90 funds, Transportation Improvement Program (TIP), MassWorks Infrastructure Program, Community Development Block Grants (CDBG), or other State and Federal funds for street and infrastructure design; shall adhere to the Town of Carlisle Complete Street Policy, subject to and as may be modified by funding agency guidelines and standards.
3. The Town of Carlisle will work with other agencies, departments, or jurisdictions to advance the Complete Streets Policy.
4. Private developments and related or corresponding street design and construction components shall adhere to the Town of Carlisle Complete Streets Policy.

Design: Complete Streets principles may be achieved by incorporating elements into a project at the start or by adding elements incrementally through a series of smaller improvements or maintenance activities. The latest design guidance, standards, and recommendations available will be used in the implementation of Complete Streets, including the most up-to-date versions of:

1. The Massachusetts Department of Transportation's *Project Design and Development Guidebook*
2. The American Association of State Highway Transportation Officials' (AASHTO) *A Policy on Geometric Design of Highways and Streets*
3. The United States Department of Transportation's Federal Highway Administration's *Manual on Uniform Traffic Control Devices (MUTCD)*
4. The Architectural Access Board's (AAB) 521 CMR Rules and Regulations

Context Sensitivity: Carlisle is a rural community with a beautiful historic district, open vistas, and many roads designated as Scenic Roads under G.L.c.40, Para 15C. Accordingly, all proposed projects and improvements will be evaluated in the context of our community character and environment. Complete Streets principles recognize the development and implementation of projects take place in a manner that balances the community's environmental, economic, and cultural setting. The context-sensitive approach to the Complete Streets process will include design flexibility that balances the needs and values of stakeholders and the community and encourages participation by those affected to gain project consensus. The overall goal is to preserve and enhance scenic, aesthetic, historical, and environmental resources while improving and maintaining safety, mobility, and infrastructure conditions.

Implementation and Performance Measures: The Board of Selectmen will form a multi-disciplinary Complete Streets Advisory Committee that will be comprised of members of the Traffic Safety Advisory Committee, Pathway Committee II, Planning Board, Master Plan Committee and Town Administrator's office as well as other committees, departments, or organizations as appropriate. The focus of this Committee will be ensuring the implementation of the Complete Streets policy and, where necessary, altering existing practices and overcoming barriers that may act as impediments to implementation. In addition, the Committee will regularly update and solicit feedback on potential projects with the community to ensure the perspectives of the community are considered and incorporated, as appropriate.

1. The Town shall make Complete Streets practices a routine part of everyday operations, shall approach transportation projects as an opportunity to improve streets and the transportation network for all users, and shall work in cooperation with other departments, state and federal agencies, and adjoining towns to implement Complete Streets.
2. The Complete Streets Committee, with assistance from the Department of Public Works, will maintain a comprehensive inventory of pedestrian and bicycle facilities and any other relevant infrastructure on each street.
3. The Traffic Safety Advisory Group will conduct a Complete Streets review of all transportation infrastructure projects during conceptual design.
4. The Town shall make all efforts to provide training for staff on Complete Streets principles and best practices through workshops and other means.
5. The Town will promote inter-departmental coordination among all Town departments to achieve the most responsible and efficient use of resources for activities within the public Right-of-Way.
6. The Town will seek appropriate sources of funding, including grants, for implementing its Complete Streets policy.
7. The Complete Streets Committee will evaluate annually Complete Streets implementation for effectiveness, identify opportunities for improvement, and present the results of the evaluation to the Board of Selectmen. The evaluation shall include performance measures such as linear feet of new or improved sidewalks, miles of bicycle accommodation, new or improved crosswalks, curb ramp improvements, and review of new traffic counts and crash data to help set priorities for local action.

#### BOARD OF SELECTMEN

*Adopted July 10, 2018*

**Appendix L**  
**Right to Farm Bylaw**

APPENDIX

**L**

# **Appendix L: Right to Farm Bylaw**

## **GENERAL BYLAWS ARTICLE XVIII RIGHT TO FARM**

### **18.1 Legislative Purpose and Intent**

The purpose and intent of this By-law is to state with emphasis the Right to Farm accorded to all citizens of the Commonwealth under Article 97 of the Constitution, and all state statutes and regulations thereunder including, but not limited to, Massachusetts General Laws Chapter 40A, Section 3, Paragraph 1; Chapter 90, Section 9; Chapter 111, Section 125A; and Chapter 128 Section 1A. We the citizens of Carlisle restate and republish these rights pursuant to the Town's authority conferred by Article 89 of the Articles of Amendment of the Massachusetts Constitution ("Home Rule Amendment").

This General By-law encourages the pursuit of agriculture, promotes agriculture- based economic opportunities and the natural and ecological value of the land, and protects farmlands within the Town of Carlisle by allowing agricultural uses and related activities to function with minimal conflict with abutters and Town agencies. This By-law shall apply to all jurisdictional areas within the Town.

The benefits and protections affirmed by this By-law are intended to apply exclusively to those agricultural operations and activities conducted in accordance with generally accepted agricultural practices. No benefits and protections are conferred to agricultural activities whenever adverse impact results from negligence or willful or reckless misconduct in the operation of any such agricultural or farming operation, place, establishment or facility or any of its appurtenances.

### **18.2 Definitions**

The word "farm" shall include any parcel or contiguous parcels of land or water bodies used for the primary purpose of commercial agriculture, or accessory thereto.

The words "farming" or "agriculture" or their derivatives shall include, but not be limited to, the following:

- farming in all its branches and the cultivation and tillage of the soil;
- dairying;
- production, cultivation, growing, and harvesting of any agricultural, aquacultural, floricultural, viticultural, or horticultural commodities;
- growing and harvesting of forest products upon forest land, and any other forestry or lumbering operations;
- raising of livestock, including horses, and keeping of horses as a commercial enterprise; and
- keeping and raising of poultry, swine, cattle, goats, sheep, ratites (such as emus, ostriches and rheas) and camelids (such as llamas and camels), and
- other domesticated animals for food and other agricultural purposes, including bees and fur-bearing animals.

“Farming” shall encompass activities including, but not limited to, the following:

- operation and transportation of slow-moving farm equipment over roads within the Town;
- control of pests, including, but not limited to, insects, weeds, predators, and disease organism of plants and animals;
- application of manure, fertilizers, and pesticides;
- conducting agriculture-related educational and farm-based recreational activities, including agri-tourism, provided that the activities are related to marketing the agricultural output or services of the farm;
- processing and packaging of the agricultural output of the farm and the operation of a farmer's market or farm stand including signage thereto;
- maintenance, repair, or storage of seasonal equipment or apparatus owned or leased by the farm owner or manager used expressly for the purpose of propagation, processing, management, or sale of the agricultural products; and
- on-farm relocation of earth and the clearing of ground for farming operations.

### **18.3 Right To Farm Declaration**

The Right to Farm is hereby recognized to exist within the Town of Carlisle. The above-described agricultural activities may occur on holidays, weekdays, and weekends by night or day and shall include the attendant incidental noise, odors, dust, and fumes associated with normally accepted agricultural practices. It is hereby determined that whatever impact may be caused to others through the normal practice of agriculture is more than offset by the benefits of farming to the neighborhood, community, and society in general. The benefits and protections of this By-law are intended to apply to agricultural and farming operations as described in the Massachusetts Constitution and General Laws noted in Section 1 of this document. Furthermore, nothing in this Right to Farm By-law shall be deemed as acquiring any interest in land or as imposing any land use regulation, which is properly the subject of state statute, regulation, or local zoning law.

### **18.4 Disclosure Notification**

Within 30 days after this By-law becomes effective, the Board of Selectmen shall post the following disclosure on the official bulletin board and website of the Town, at any other location at its discretion, and make such disclosure available for distribution upon request in the offices of the Board of Selectmen, Board of Assessors, and the Town Clerk.

“It is the policy of Town of Carlisle to conserve, protect and encourage the maintenance and improvement of agricultural land for the production of food, and other agricultural products, and also for its natural and ecological value. This disclosure notification is to inform buyers or occupants that the property they are about to acquire or occupy lays within a town where farming activities occur. Such farming activities may include, but are not limited to, activities that cause noise, dust and odors. Buyers or occupants are also informed that the location of property within the Town may be impacted by commercial agricultural operations including the ability to access water services for such property under certain circumstances.”

### **18.5 Resolution of Disputes**

Any person having a complaint about a farm or farming activity or practice is encouraged to seek an amicable solution through resolution directly with the owner or operator of the farm at issue. Such person may also, notwithstanding the pursuit of other available remedies, file such a complaint with the Board of Selectmen. The Board of Selectmen may, at its sole discretion and to the extent the Board believes resolution of the matter may be facilitated by involvement of the Town, forward the complaint to the Agriculture Commission, or other appropriate board or officer, and request that recommendations for resolution be provided within an agreed upon timeframe. Notwithstanding any other provision of this section, however, the Board of Selectmen shall not be required to forward a complaint filed in accordance herewith or to take any other action.

### **18.6 Severability Clause**

If any part of this By-law is for any reason held to be unconstitutional or invalid, such decision shall not affect the remainder of this By-law. The Town of Carlisle hereby declares the provisions of this By-law to be severable.